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# NAVY PIER

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## HEADLANDS STREET IMPROVEMENTS

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### PHASE II ENVIRONMENTAL SITE ASSESSMENT

*November 6, 1992*

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**ENVIRODYNE  
ENGINEERS**

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New York

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■ Michigan

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Table of Contents

	<u>Page</u>
EXECUTIVE SUMMARY .....	i
1.0 INTRODUCTION .....	1
2.0 SITE LOCATION .....	2
3.0 PREVIOUS INVESTIGATIONS .....	2
4.0 SCOPE OF WORK .....	3
5.0 INVESTIGATION PROCEDURES .....	4
6.0 MONITORING WELLS .....	6
6.1 WELL CONSTRUCTION .....	6
6.2 GROUNDWATER ELEVATION .....	6
6.3 WATER SAMPLING .....	8
7.0 LABORATORY TESTING .....	8
8.0 ANALYTICAL RESULTS .....	9
8.1 METALS ANALYSIS .....	9
8.2 BENZENE, ETHYLBENZENE, TOLUENE, XYLENE .....	10
8.3 POLYNUCLEAR AROMATIC HYDROCARBONS .....	11
9.0 CONCLUSIONS .....	13
9.1 SOILS .....	13
9.2 GROUNDWATER .....	14
9.3 CONSTRUCTION CONSIDERATIONS .....	15

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PHASE II  
ENVIRONMENTAL SITE ASSESSMENT

Exhibits

Follows Page

1.	VICINITY MAP .....	2
2.	MAP SHOWING POTENTIAL AREAS OF CONTAMINATION .....	2
3.	SOIL BORING AND MONITORING WELL LOCATIONS .....	3

Tables

1.	ANALYTICAL RESULTS - METALS .....	9
2.	ANALYTICAL RESULTS - BETX .....	10
3.	ANALYTICAL RESULTS - PNAs .....	12
4.	ANALYTICAL RESULTS - NON-CARCINOGENIC PNAs .....	12
5.	ANALYTICAL RESULTS - CARCINOGENIC PNAs .....	12

Appendices

- A. MONITORING WELL DIAGRAM, BORING LOGS
- B. SOILS ANALYSIS
- C. GROUNDWATER ANALYSIS
- D. PRELIMINARY COST ESTIMATES FOR ENVIRONMENTAL REMEDIATION ON THE HEADLANDS

MAP SHOWING AREAS OF HAZARDOUS WASTE CONTAMINATION

## EXECUTIVE SUMMARY

Based on the results of the Phase I environmental site assessment of the Navy Pier Headlands conducted in March, 1992, Envirodyne Engineers, Inc. recommended that a Phase II, subsurface sampling and analysis program be conducted to test for organic compounds and heavy metals in the areas of concern. The Phase II drilling and sampling program was conducted during August 1992 and sample analysis was completed during September 1992. Thirteen soil borings were drilled to a depth of thirteen feet. Exhibit 3 shows location of soil borings. Soil samples were collected at intervals of 1-5 feet, 5-9 feet, 9-13 feet. The collected samples were analyzed for polynuclear aromatic hydrocarbons, benzene, ethylbenzene, toluene, xylene, arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Five of the soil borings were converted to groundwater wells. Groundwater samples were collected and analyzed for the same parameters.

The results of the analysis showed that concentrations of heavy metals exceeded the limits for hazardous wastes in four samples collected at two locations (I3 and S3). The concentration of selenium was at the hazardous waste limit in samples collected from borings located at S6 and S7.

Elevated benzene concentrations were found in five soil samples collected at four locations (I3, S2, S9, and S10). Concentrations ranged from 0.008 parts per million to 0.053 parts per million. Ethylbenzene, toluene, and xylene were found at very low concentrations in some samples. Concentrations ranged from 0.123 parts per million of xylene at S2 to 0.002 parts per million of toluene at boring S4.

Polynuclear aromatic hydrocarbons were found extensively in soil samples taken at all locations and at nearly all depths. Some types of polynuclear aromatic hydrocarbons are known carcinogens, however hazardous waste regulations do not include any polynuclear aromatic

hydrocarbons in the toxicity characteristic listing. As a result the polynuclear aromatic hydrocarbons, as they are present on the Headlands, are not considered hazardous wastes. They are, however, considered industrial process or "special waste" in the State of Illinois.

Analysis of the groundwater showed that although minute concentrations of metals and polynuclear aromatic hydrocarbons were present in some samples, levels were far below the groundwater limits.

State regulations on disposal of special and hazardous waste are set forth in Title 35: Environmental Protection, Subtitle G: Waste Disposal, Chapter I: Pollution Control Board. These regulations pertain to the generation, transportation, storage, treatment, and disposal of solid waste (garbage), special waste (industrial process wastes), and hazardous waste (as defined by the Resource Conservation and Recovery Act, and the Hazardous and Solid Waste Amendments). There are no specific rules and regulations in Title 35 that address situations such as the presence of contaminants on the Headlands.

The only language that address this condition is contained in the provision of the Illinois Environmental Protection Act which forbids the contamination or degradation of groundwater. The case can be made that the presence of contaminants in the soil endangers the groundwater quality since it is possible for the contaminants to leach into the groundwater. This depends greatly on the characteristics, and solubility of the contaminant and the individual situation.

It is suggested that the area occupied by Lake Shore Marine (the GSA property), the area adjacent to Rocky's Fish House, and Lake Point Towers be further investigated to determine more precisely, the extent of contamination. In addition consideration should be given to entering into a voluntary clean up in cooperation with the Illinois Environmental Protection Agency. The Illinois EPA would set site specific clean up objectives and standards for removal of contaminated material. Once the area was remediated to the Illinois EPA specifications, IEPA would provide a "clean letter" documenting their approval of the clean up.

Concentrations of heavy metals at or exceeding the limit for hazardous wastes were found in four areas of the site. Any materials excavated or disturbed in these areas must be managed and disposed of as hazardous wastes in accordance with the rules and regulations governing hazardous waste generation, storage, and disposal/treatment. Transportation, treatment and disposal costs for hazardous wastes are typically in the neighborhood of \$300 per cubic yard.

The presence of organic contaminants in the soil results in these materials being designated as industrial or "special wastes". There are some requirements concerning the disposal of these materials, however, they are not as stringent as those for hazardous wastes. Soils excavated from the headlands should be evaluated and possibly tested further to determine the correct transportation and disposal alternatives. Costs for transportation and disposal of "special wastes" typically are approximately \$40 per cubic yard.

Alternatives for addressing contaminated areas of the site remaining after construction depend upon cleanup objectives and requirements set by the Illinois Environmental Protection Agency. Remedial measures could include continued periodic monitoring of the groundwater below the site, soil removal, bioremediation, an alternative technology, or a combination of these. Appendix D includes estimates of remedial actions based upon current knowledge of the site.

## 1.0 INTRODUCTION

The City of Chicago, Department of Transportation (CDOT) is planning to construct street improvements on the Navy Pier Headlands in conjunction with the reconstruction of Navy Pier. These improvements will be funded by the Federal Highway Administration (FHWA) and the Illinois Department of Transportation (IDOT). A Phase I Environmental Site Assessment was performed by Enviromdyne Engineers Inc. (EEI) in March, 1992 to supplement the preliminary engineering studies being conducted for the street improvements. The finding of the Phase I study indicated that areas on the Headlands may have been contaminated from past and present land uses.

Based on the results of the Phase I study, EEI recommended that a Phase II, subsurface sampling and analysis program be conducted to test for organic compounds and heavy metals in the areas of concern. In response to this recommendation, EEI was directed to perform a Phase II Environmental Site Assessment. The Phase II drilling and sampling program was conducted during August 1992 and sample analysis was completed during September.

The Phase II Investigation was conducted to identify contaminants and establish their concentration by collecting and analyzing soil and groundwater samples along Illinois Street and Streeter Drive. This report documents the site location, previous studies, the procedures for environmental drilling, sampling and decontamination activities for this investigation; Enviromdyne's evaluation of the analytical results of soil samples collected at the site; and presents findings and recommendations.

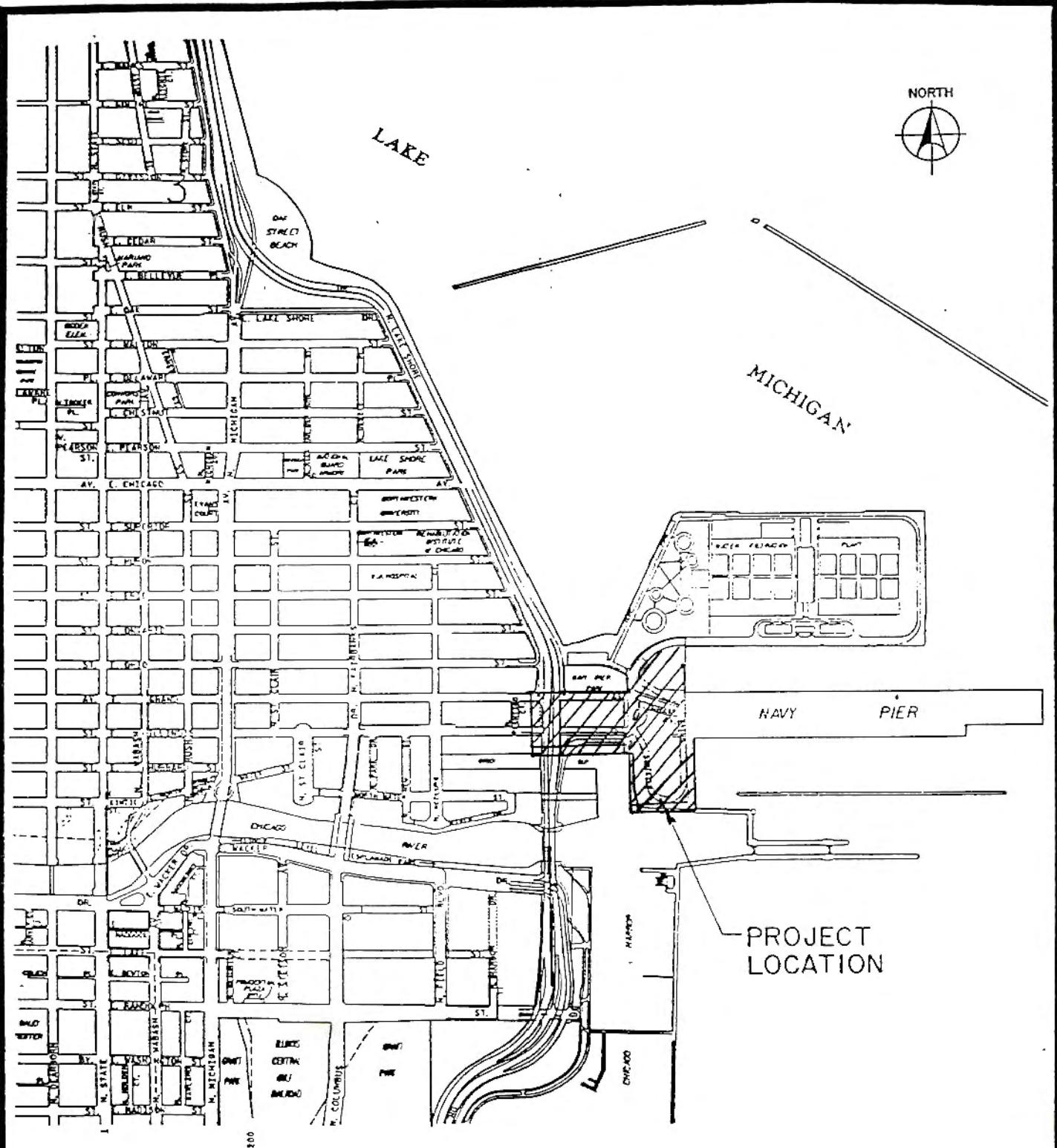
## 2.0 SITE LOCATION

The Navy Pier Headlands is located within the City of Chicago Along the downtown Lake Michigan shoreline. The Headlands occupies a peninsula of land at the eastern terminus of Illinois and Grand Avenues. The area is flanked by Lake Michigan and the Jardine Water Purification Plant to the north, Ogden Slip to the south, Lake Michigan and Navy Pier to the east, and Lake Point Tower and Lake Shore Drive to the west. A site location map showing the boundaries of the study area is presented as Exhibit 1.

## 3.0 PREVIOUS INVESTIGATIONS

A Phase I investigation was performed for the Headlands site by EEI in March 1992. The investigation reviewed historical information, environmental data bases, and contacted state and local agencies to find information on potential environmental impacts from past and present land uses on the Headlands. The Phase I study identified three primary areas of concern. These areas of concern are shown on Exhibit 2 and are described below:

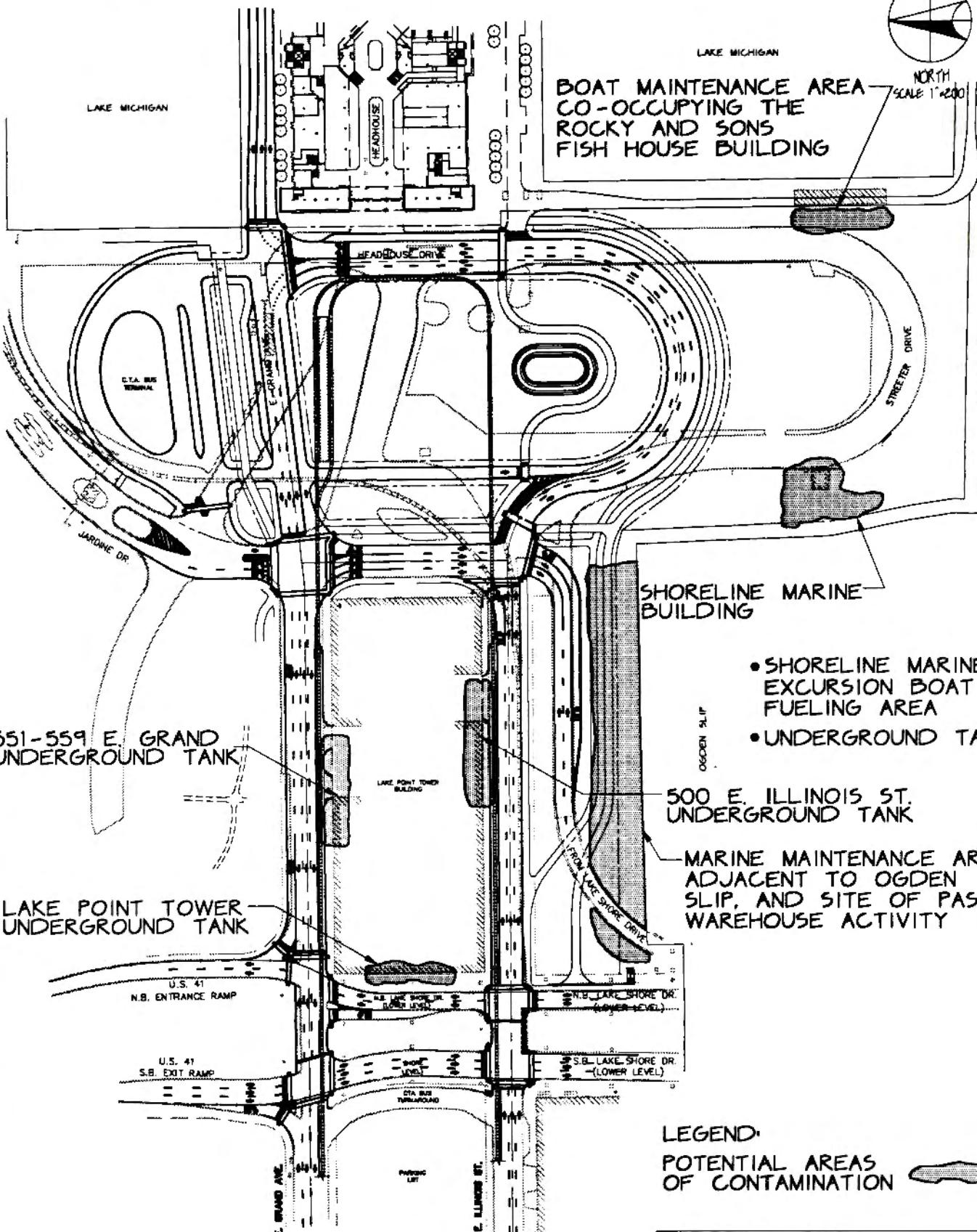
- The area adjacent to the Ogden Slip. Potential contamination may have resulted from past and present industrial and commercial use land. Past use included warehouse and maintenance activities. Present uses include marine maintenance activities. Several 55 gallon drums containing oils were present in the area at the time of the Phase I study. One of these drums was observed to be leaking oil. At the time of the Phase II investigation, the drums had been removed.
- The area in the vicinity of the Shoreline Marine building (also referred to as the GSA property or Chicago Mooring Site) at 94 North Streeter Drive (south of the intersection of Illinois Street and Streeter Drive). Potential contamination may



VICINITY MAP  
NAVY PIER HEADLANDS  
CHICAGO, ILLINOIS

SEPTEMBER 18, 1992

EXHIBIT 1



SITE LOCATION MAP  
POTENTIAL AREAS OF CONTAMINATION  
NAVY PIER HEADLANDS  
CHICAGO, ILLINOIS  
SEPTEMBER 18, 1992 EXHIBIT 2

have resulted from a suspected underground storage tank. In addition, the area has been used for boat maintenance and fueling. Several 55 gallon drums containing oils and anti-freeze and an above ground storage tank containing oil were observed on the site during the Phase I investigation.

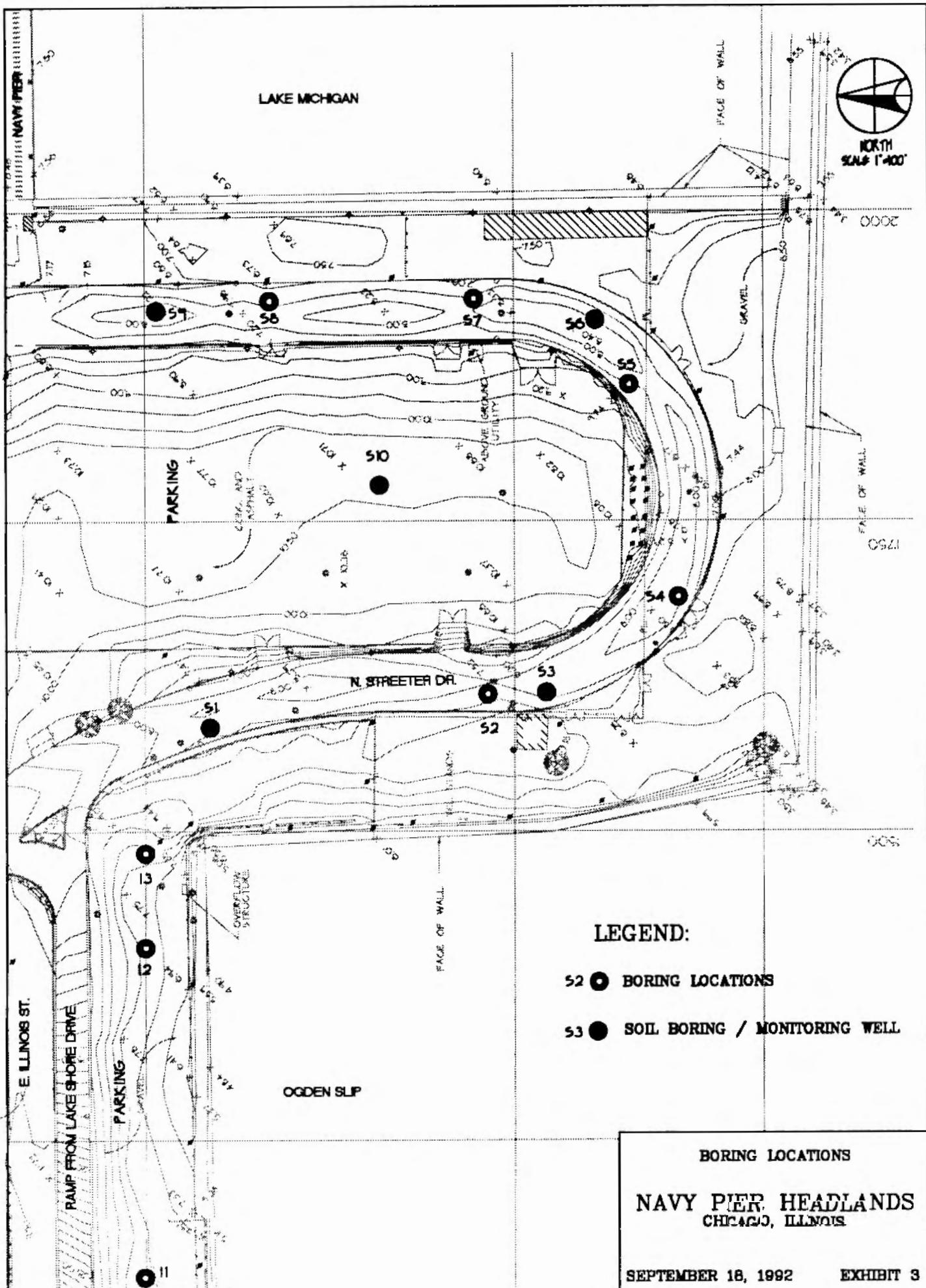
- The area adjacent to the Rocky and Sons Fish House at 138 North Streeter Drive. Potential contamination may have resulted from activities associated with a boat maintenance business co-occupying the site. Although no drums or tanks containing oil or other liquids were observed at the site, the boat maintenance activities occurring at this site since 1978 could have been a source of contaminants.

#### 4.0 SCOPE OF WORK

Envirodyne directed O'Brien & Associates, Inc. in drilling thirteen borings along Illinois Street, the southern half of Streeter Drive, and in the central area of the parking lot encompassed by Streeter Drive. Exhibit 3 shows the location of the borings. In addition, EEI collected and transported groundwater and soil samples to Grace Analytical Labs, Inc. for analysis, and assisted O'Brien in meeting on-site health and safety direction.

The scope of work for this investigation included the following:

- contracting and overseeing of the drilling of thirteen (13) soil borings, each 13 feet in depth and the installation of five (5) groundwater wells;
- screening soil samples with an HNu photoionization detector for the presence of volatile organic compounds;
- collecting composite samples for each boring at intervals of 1-5 feet, 5-9 feet, and 9-13 feet, and submitting those samples for laboratory analysis; and



- collecting groundwater samples at five locations (S1, S3, S6, S9, and S10) and submitting those samples for laboratory analysis; and
- reviewing analytical results and providing findings and recommendations.

All groundwater and soil samples were analyzed by Grace Analytical Lab, Inc. of Berkeley, Illinois.

## 5.0 INVESTIGATION PROCEDURES

As shown by Exhibit 3, three (3) borings were drilled in the gravel parking lot adjacent to Illinois Street, nine (9) were drilled along the south half of Streeter Drive, and one boring was located in the central area of the parking lot encompassed by Streeter Drive. Each boring was drilled to a depth of 13 feet below grade. The borings were located in the field by Envirodyne personnel without the use of surveying instruments. Borings S1, S3, S6, S9, and S10 were converted into monitoring wells. The remainder of the borings were backfilled with cuttings and the surface was patched with concrete.

The three borings adjacent to Illinois Street were designated as (from west to east) I1, I2, and I3. The borings along Streeter Drive (from west to east) were designated as S1, S2, S3, S4, S5, S6, S7, S8, and S9. The boring located in the central parking lot was designated as S10. The borings were numbered in the order of which they were drilled, I1 being drilled first and S10 being drilled last. Appendix A provides boring construction logs for each of the thirteen borings.

O'Brien & Associates conducted the drilling using a truck mounted rotary drilling rig, employing hollow stem continuous flight augers. Soil from the split spoon sample was screened using an HNu photoionization detector, and representative samples were obtained at intervals of 0-5 feet, 5-9 feet, 9-13 feet, by means of a standard split spoon sampler, in general accordance with ASTM D-1586. One composite sample was collected at each of the three intervals for each

boring. The drilling was performed under level D protection with provisions for level C if required from elevated HNu readings.

The split spoon sampler was decontaminated between sampling intervals with a detergent wash and water rinse. The drill rig and drilling tools were decontaminated by high pressure power washer before and after completion of each boring. Collected soil and groundwater samples were maintained at appropriate sample preservation temperature and transported to Grace Analytical Labs, Inc. Auger cuttings from the boreholes and bentonite powder were used to backfill and seal the borings.

During drilling operations, soil samples were screened in the field for the presence of volatile organic compounds via a HNu photo-ionization detector (PID). Background levels for the HNu, following field calibration, was recorded at one part per million (ppm). Readings above 1 ppm during screening were recorded as positive organic readings. Seven sample screens were recorded above the 1 part per million level for organics. These screens were:

- Sample S5 recorded a 15 and 6 point reading in the 0-5 foot interval, and a 4 and 6 point reading at the 5-9 foot interval.
- Sample S6 showed a 5 point reading at the 0-5 foot interval and a 2 point reading at the 5-9 foot interval.
- Sample S9 showed readings of 9 and 4 at the 0-5 foot interval and 3 and 8 at the 5-9 foot interval.
- Sample S10 showed a 3 point HNu reading at the 0-5 foot interval.

Analytical results showed that the volatile organics compounds benzene, toluene, xylene, and ethylbenzene were found in samples from borings I3, S2, and S10. There was no correlation between the HNu readings and the volatile organics found in laboratory testing.

## 6.0 MONITORING WELLS

### 6.1 WELL CONSTRUCTION

Borings S1, S3, S6, S9, and S10 were converted into monitoring wells. Groundwater was encountered at a depth of approximately 5 to 7 feet and the boring was drilled to a depth of 10 feet. PVC tubing, two inches in diameter were used (Schedule 40) in constructing the well. The bottom of the tubing was capped and the lower 5 feet were slotted to allow groundwater to flow into the well. The tubing was placed into the completed boring, clean sand was used to backfill around the slotted five feet of tubing at the bottom of the well. After the sand was placed around the slotted five foot segment, one foot of bentonite chips were used to seal the area above the sand with cuttings used to fill the remaining space to within one foot of the top of the well. The remaining foot was filled with concrete and a cast iron cap was set in the concrete. The well was finished and the cap was set at ground level. Appendix A includes a generalized schematic diagram of the well.

### 6.2 GROUNDWATER ELEVATION

On August 21, 1992, the water elevations were measured and recorded for each well after all the well caps were removed and the water elevations were allowed to equalize. The water elevations were measured from the top of the PVC riser to the water level using a water level indicator. The total depth of each well was also measured. S1 was 9.3 feet deep, S3 was 10.1 feet deep, S6 was 9.9 feet deep, and S9 & S10 were both 10 feet deep. The fact that S1 and S6 were less than 10 feet in depth is attributed to silt entering through the slotted portion of the well.

The following table shows the well cap elevations and the groundwater elevations:

WELL NUMBER	WELL ELEVATION (FEET)	GROUNDWATER ELEVATION (FEET)	
		8-21-92	9-17-92
S1	7.930	2.99	3.47
S3	7.815	0.11	1.14
S6	7.365	1.14	1.77
S9	7.845	1.11	1.03
S10	10.165	3.59	4.77

The groundwater elevations suggest that there is no groundwater flow through the Headlands.

### 6.3 WATER SAMPLING

Water samples were collected from each well. All wells except S3 exhibited rapid recharge. Three to five well volumes were bailed from each well. The groundwater was poured into collection bottles supplied by Grace Analytical Lab, Inc. The samples were stored at 4 degrees centigrade during sampling and transport to the laboratory.

### 7.0 LABORATORY TESTING

The complete analytical results for the sampled soils are contained in Appendix B. Groundwater analytical results are contained in Appendix C. These results are further discussed below.

All soil and water samples were analyzed for the following:

- Metals (Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver). Metals were extracted from the soil samples using the Toxicity Characteristic Leaching Procedure (TCLP) method. The groundwater samples were analyzed for total metals
- Benzene, Ethylbenzene, Toluene, Xylene (BTEX). These are volatile organic compounds associated with the "lighter ends" of petroleum products, especially gasoline.
- Polynuclear Aromatic Hydrocarbons (PNAs). These are semivolatile organic compounds found in petroleum products.

## 8.0 ANALYTICAL RESULTS

### 8.1 METALS ANALYSIS

The Resource Conservation and Recovery Act and the associated Federal Regulations define concentration limits for eight metals (Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver) and 32 other organic compounds. A waste that exceeded the concentration limit for any of the 40 listed compounds was defined as hazardous due to toxicity. (A waste can also be hazardous by ignitability, corrosivity, reactivity or it can be a listed hazardous waste).

The Toxicity Characteristic Leaching Procedure (TCLP) is the analytical procedure required by the Federal Regulations to determine the contaminant concentration. This test is designed to mimic acidic conditions in a landfill which would cause hazardous contaminants to leach out of the waste. Therefore, as part of the analytical preparation, an acid is used to leach the contaminants from the waste or in this case, from the soil. The contaminant concentration in the material leached from the soil is then analyzed and the concentration of the contaminants is determined.

The soil sample taken from the 5-9 foot depth from the I3 boring was found to have a concentration of 20 parts per million of arsenic which is in exceedance of the EPA limit for hazardous wastes (5 parts per million). Lead concentrations were found to exceed the EPA hazardous waste limit of 5 parts per million in three soil samples - I3 at the 1-5 foot depth; S2 at the 1-5 foot depth and at the 9-13 foot depth. Concentrations of Selenium were found to be at the limit in borings S6 and S7. Materials excavated in these areas which are at, or exceed the EPA limit are considered to be "hazardous wastes" and must be disposed of in accordance with 40 CFR Parts 260, 261, 262, and 263.

TABLE 1

## NAVY PIER HEADLANDS ANALYTICAL REPORT - METALS (TCLP)

LOCATION	DEPTH	ARSENIC	BARIUM	CADMIUM	CHROME	LEAD	SELENIUM	SILVER
EPA LIMIT		5.00	100.00	1.00	5.00	5.00	1.00	5.00
I1	1-5	0.00	5.40	0.02	0.05	0.47	0.00	0.02
I1	5-9	0.00	1.10	0.00	0.03	3.45	0.00	0.00
I1	9-13	0.00	1.70	0.00	0.03	0.66	0.00	0.00
I2	1-5	0.00	1.40	0.00	0.02	0.15	0.00	0.02
I2	5-9	0.00	2.40	0.02	0.02	0.17	0.00	0.02
I2	9-13	0.00	2.70	0.00	0.02	0.13	0.00	0.00
I3	1-5	0.00	5.20	0.03	0.00	22.20	0.00	0.02
I3	5-9	20.00	1.40	0.00	0.00	0.26	0.00	0.00
I3	9-13	0.00	1.00	0.00	0.00	0.32	0.00	0.00
S1	1-5	0.00	1.20	0.00	0.02	0.02	0.00	0.00
S1	5-9	0.00	3.10	0.00	0.00	0.13	0.00	0.00
S1	9-13	0.00	4.40	0.00	0.00	0.14	0.00	0.00
S2	1-5	0.32	2.10	0.03	0.02	10.80	0.00	0.00
S2	5-9	0.00	2.60	0.00	0.02	0.09	0.00	0.00
S2	9-13	0.00	2.00	0.03	0.02	57.60	0.00	0.00
S3	1-5	0.00	18.50	0.02	0.02	4.18	0.00	0.03
S3	5-9	0.00	2.80	0.00	0.03	0.46	0.00	0.02
S3	9-13	0.00	2.20	0.00	0.00	0.14	0.00	0.02
S4	1-5	0.00	1.40	0.00	0.00	0.13	0.00	0.00
S4	5-9	0.00	2.00	0.00	0.00	0.05	0.00	0.00
S4	9-13	0.00	1.30	0.00	0.00	0.14	0.00	0.02
S5	1-5	0.00	2.40	0.00	0.02	0.22	0.00	0.00
S5	5-9	0.00	2.30	0.02	0.02	0.15	0.00	0.02
S5	9-13	0.00	4.30	0.00	0.03	0.14	0.00	0.00
S6	1-5	0.00	2.50	0.00	0.02	1.36	0.00	0.00
S6	5-9	0.00	2.70	0.00	0.00	0.27	0.00	0.02
S6	9-13	0.00	2.00	0.00	0.02	0.19	1.00	0.02
S7	1-5	0.00	2.30	0.00	0.00	2.63	1.00	0.00
S7	5-9	0.00	4.60	0.00	0.00	0.06	0.80	0.00
S7	9-13	0.00	2.50	0.00	0.03	0.15	1.00	0.02
S8	1-5	0.00	8.40	0.02	0.02	0.54	0.00	0.03
S8	5-9	0.00	1.60	0.02	0.02	0.15	0.00	0.00
S8	9-13	0.00	2.20	0.00	0.00	0.17	0.00	0.02
S9	1-5	0.00	2.80	0.02	0.02	0.92	0.00	0.00
S9	1-5	0.00	2.60	0.02	0.02	0.11	0.80	0.02
S9	1-5	0.00	3.40	0.00	0.00	0.11	0.00	0.02
S10	1-5	0.00	2.00	0.02	0.00	2.34	0.00	0.02
S10	1-5	0.00	1.70	0.02	0.02	1.13	0.00	0.00
S10	1-5	0.00	2.30	0.00	0.03	0.32	0.00	0.02

CONCENTRATIONS IN PARTS PER MILLION (PPM)

0 = CONCENTRATION BELOW DETECTION LIMITS

SHADED AREAS INDICATE LEVEL IS AT OR ABOVE EPA HAZARDOUS WASTE LIMIT

Groundwater samples were analyzed for total metals since there is nothing to "leach" in an aqueous sample. Low levels of barium were found in all samples. Low levels of chromium were found in samples collected from monitor wells at S1, S3, and S9. All of the levels of chromium and barium were well below the Illinois Environmental Protection Agency's groundwater limits.

Table 1 summarizes the results of the laboratory analysis for TCLP metals from the soil samples. The analytical results for the groundwater analyses are contained in Appendix C.

## 8.2 BENZENE, ETHYLBENZENE, TOLUENE, XYLENE (BTEX)

All soil samples were analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX). The results of these analyses are presented in Table 2. The shaded areas on Table 2 indicate contaminant concentrations above the IEPA soil clean up objectives for leaking underground storage tanks. Benzene was the only contaminant that was detected in concentrations above the clean up objective. Recorded levels ranged between a low of 2 parts per billion (at the 1-5 foot depth at I3 and S5) to a high of 53 parts per billion at the 5-9 foot depth at boring I3. The IEPA clean up objective for benzene concentrations in the soil from leaking underground storage tanks is 5.0 parts per billion.

The IEPA clean up objectives for leaking underground tanks is cited since there is some evidence that the contaminants at the S2 location may be from a leaking tank or tanks (A January, 1989 O.M. Materials report to the U.S. Coast Guard Facility states that three underground storage tanks used for the storage of gasoline and waste oil were located on the facility. The report states that "one tank has been abandoned and the other two tanks were suspected to be leaking". A memo to the Illinois Environmental Protection Agency from Matt Arnold of Environmental Science & Engineering states that on November 28, 1989 one 500 gallon heating oil tank was removed from the site. It was reported in the memo that the tank was in very good condition and that no signs of soil contamination were evident.)

TABLE 2  
NAVY PIER HEADLANDS ANALYTICAL REPORT - BETX (CONCENTRATIONS IN PPM)

LOCATION	DEPTH	BENZENE	ETHYLBENZENE	TOLUENE	XYLENE	TOTAL BETX
EPA LIMIT		0.005	NONE	NONE	NONE	11.705
I1	1-5	0.000	0.000	0.000	0.000	0.000
I1	5-9	0.000	0.000	0.000	0.000	0.000
I1	9-13	0.000	0.000	0.000	0.000	0.000
I2	1-5	0.000	0.000	0.000	0.000	0.000
I2	5-9	0.000	0.000	0.000	0.000	0.000
I2	9-13	0.000	0.000	0.000	0.000	0.000
I3	1-5	0.002	0.000	0.002	0.000	0.004
I3	5-9	0.053	0.003	0.011	0.123	0.190
I3	9-13	0.000	0.000	0.000	0.000	0.000
S1	1-5	0.000	0.000	0.000	0.000	0.000
S1	5-9	0.000	0.000	0.000	0.000	0.000
S1	9-13	0.000	0.000	0.000	0.000	0.000
S2	1-5	0.008	0.000	0.003	0.000	0.010
S2	5-9	0.013	0.009	0.012	0.031	0.064
S2	9-13	0.000	0.000	0.000	0.000	0.000
S3	1-5	0.000	0.000	0.000	0.000	0.000
S3	5-9	0.000	0.000	0.000	0.000	0.000
S3	9-13	0.000	0.000	0.000	0.000	0.000
S4	1-5	0.003	0.000	0.002	0.000	0.005
S4	5-9	0.000	0.000	0.000	0.000	0.000
S4	9-13	0.000	0.000	0.000	0.000	0.000
S5	1-5	0.002	0.000	0.000	0.000	0.002
S5	5-9	0.000	0.000	0.000	0.000	0.000
S5	9-13	0.000	0.000	0.000	0.000	0.000
S6	1-5	0.000	0.000	0.000	0.005	0.005
S6	5-9	0.000	0.000	0.000	0.000	0.000
S6	9-13	0.000	0.000	0.000	0.000	0.000
S7	1-5	0.004	0.000	0.000	0.000	0.004
S7	5-9	0.000	0.000	0.000	0.000	0.000
S7	9-13	0.000	0.000	0.000	0.000	0.000
S8	1-5	0.000	0.000	0.000	0.000	0.000
S8	5-9	0.000	0.000	0.000	0.000	0.000
S8	9-13	0.000	0.000	0.000	0.000	0.000
S9	1-5	0.026	0.003	0.007	0.005	0.041
S9	5-9	0.000	0.000	0.000	0.000	0.000
S9	9-13	0.000	0.000	0.000	0.000	0.000
S10	1-5	0.000	0.000	0.000	0.000	0.000
S10	5-9	0.008	0.000	0.000	0.000	0.008
S10	9-13	0.000	0.000	0.000	0.000	0.000

0 = COMPOUND BELOW DETECTION LIMITS  
 SHADED AREAS INDICATE LEVEL IS ABOVE EPA LIMIT FOR LEAKING UNDERGROUND TANKS

It is possible that the contaminants are from other sources, in which case the leaking tank clean up objectives can be used for comparison purposes.

No detectable levels of benzene, toluene, xylene, or ethylbenzene were found in any of the groundwater samples.

### 8.3 POLYNUCLEAR AROMATIC HYDROCARBONS

Polynuclear Aromatic Hydrocarbons (PNAs) are semivolatile organic compounds associated with the "heavier ends" of petroleum products. The Resource Conservation and Recovery Act rules and regulations do not include PNAs on their list of toxicity criteria in Part 261 of the Code of Federal Regulations. Therefore, soils contaminated with PNAs from unknown sources are not "hazardous" according to the hazardous waste regulations. The contaminated soil is, however, considered an industrial process waste or "special waste" in the State of Illinois. The Illinois Environmental Protection Agency has set generic cleanup objectives for PNAs from leaking underground storage tanks. These objectives are presented in the following tables for comparison purposes. However, cleanup objectives for PNA contaminated materials are determined on a site specific bases by the Illinois Environmental Protection Agency.

All groundwater samples were analyzed for PNAs. The groundwater sample from location S10 showed some trace levels of PNAs, however the concentrations were far below the clean up objectives for leaking underground tanks.

Table 3 shows the concentrations of individual PNAs. The shaded areas indicate that the concentration exceeded the leaking underground tank generic clean up objectives. All borings except S7 have contaminant levels which exceed the clean up objective at some depth. Six of the thirteen borings show contaminant concentration which exceed the clean up objectives at all depths (I2, I3, S2, S3, S6, and S10). Boring S2 showed the highest concentrations of PNAs followed by I3. Boring S7 showed no concentrations above the clean up objectives in any of the samples taken at that location.

Table 4 shows the concentrations of non-carcinogenic PNAs in soil samples collected at each boring location at depths of 1-5 feet, 5-9 feet and 9-13 feet. The clean up objective in this case is the sum of all non-carcinogenic contaminant concentrations (4.2 parts per million) in each soil sample. Shaded areas indicate exceedance of the clean up objectives. Two of the thirteen borings (S2 and S10) showed concentrations that exceeded the objectives at all depths. At boring locations I3, S3, and S8, clean up objectives were exceeded at depths of 1-9 feet. Analysis of samples taken from boring locations S4 and S7 showed contaminants to be below the objectives at all depths.

Carcinogenic PNAs are listed on Table 5. As shown by the shaded areas, exceedance of the clean up objective occurred at some depth in all of the borings. The limit for carcinogenic PNAs is based upon the addition of all individual carcinogenic PNA concentrations in the sample, and the objective is very low (0.004 parts per million). The highest concentration, 103.19 parts per million, was found in the sample taken from the 5-9 foot depth at S2. In general, the highest concentrations occurred at the 1-9 foot depth. The boring located at S7 showed the lowest concentrations, with non-detectable levels at the 5-13 foot depth.

TABLE 3

## NAVY PIER HEADLANDS ANALYTICAL REPORT - PNAs (IN PPM)

LOCATION	DEPTH	NAPHTHALENE	ACENAPHTHENE	ANTHRACENE	FLUORANTHENE	FLUORENE	PYRENE
EPA LIMIT		0.025	8.400	42.000	5.600	5.600	4.200
I1	1-5	5.060	12.800	17.800	20.900	11.900	32.500
I1	5-9	0.000	0.105	0.463	1.240	0.142	1.020
I1	9-13	0.449	0.885	1.600	3.520	2.790	0.050
I2	1-5	0.778	0.955	2.760	9.780	1.230	8.290
I2	5-9	0.279	0.298	1.220	2.490	0.471	2.040
I2	9-13	1.570	2.110	4.860	10.300	3.170	8.380
I3	1-5	0.751	2.210	8.550	14.600	2.080	13.400
I3	5-9	23.900	9.800	5.230	15.200	6.820	7.760
I3	9-13	0.106	0.278	0.272	1.080	0.111	0.983
S1	1-5	1.150	4.330	23.800	40.400	5.490	35.700
S1	5-9	0.000	0.000	0.000	0.163	0.038	0.160
S1	9-13	0.000	0.000	0.000	0.053	0.000	0.059
S2	1-5	1.340	1.280	4.910	14.800	1.570	13.600
S2	5-9	46.400	29.400	75.500	31.100	44.400	32.700
S2	9-13	2.480	2.120	6.150	7.090	3.260	6.380
S3	1-5	1.560	4.290	12.700	25.600	5.180	24.600
S3	5-9	2.170	3.010	9.620	33.700	5.850	28.700
S3	9-13	0.111	0.442	0.802	2.140	0.292	1.740
S4	1-5	0.065	0.279	0.678	2.710	0.252	2.630
S4	5-9	0.000	0.000	0.185	0.204	0.073	0.206
S4	9-13	0.000	0.101	0.262	0.673	0.044	0.695
S5	1-5	2.990	14.300	5.870	94.900	18.800	69.400
S5	5-9	0.000	0.139	0.120	0.183	0.086	0.157
S5	9-13	0.000	0.000	0.000	0.000	0.000	0.000
S6	1-5	0.517	3.520	10.400	31.900	2.760	24.600
S6	5-9	0.114	0.561	0.835	2.340	0.256	2.150
S6	9-13	0.210	0.709	0.929	1.860	0.383	1.740
S7	1-5	0.000	0.000	0.000	0.272	0.000	0.095
S7	5-9	0.000	0.000	0.000	0.000	0.000	0.000
S7	9-13	0.000	0.000	0.000	0.000	0.000	0.000
S8	1-5	5.810	5.630	2.760	35.000	7.370	27.500
S8	5-9	0.618	0.753	1.330	4.030	0.864	1.980
S8	9-13	0.000	0.076	0.000	0.087	0.045	0.100
S9	1-5	0.439	0.726	1.470	4.570	0.815	2.560
S9	5-9	0.000	0.000	0.207	0.649	0.122	0.344
S9	9-13	0.000	0.238	0.255	0.373	0.165	0.318
S10	1-5	1.280	1.600	3.300	9.330	1.610	6.880
S10	5-9	8.400	2.180	4.210	9.660	2.360	7.040
S10	9-13	2.180	1.430	2.230	4.260	1.470	2.330

0 = COMPOUND BELOW DETECTION LIMITS

SHADED AREAS INDICATE LEVEL IS ABOVE EPA LIMIT FOR LEAKING UNDERGROUND TANKS

TABLE 4

NAVY PIER HEADLANDS ANALYTICAL REPORT - TOTAL NONCARCINOGENIC PNAs (IN PPM)

LOCATION	DEPTH	ACENAPHTHYLENE	BENZO(G,H,I)PERYLENE	PHENANTHRENE	TOTAL NONCARCINOGENIC PNAs
EPA LIMIT		NONE	NONE	NONE	0.004
I1	1-5	0.000	8.490	42.600	51.090
I1	5-9	0.000	0.137	1.240	1.377
I1	9-13	0.209	0.226	5.980	6.415
I2	1-5	0.089	1.160	8.950	10.199
I2	5-9	0.091	0.238	0.298	0.627
I2	9-13	0.385	0.974	12.700	14.059
I3	1-5	0.070	2.240	14.000	16.310
I3	5-9	1.090	0.320	49.000	50.410
I3	9-13	0.000	0.173	0.778	0.849
S1	1-5	0.000	3.780	36.000	39.780
S1	5-9	0.000	0.034	0.256	0.290
S1	9-13	0.000	0.000	0.175	0.175
S2	1-5	0.058	2.380	14.800	17.238
S2	5-9	5.340	10.400	103.000	118.740
S2	9-13	0.263	0.494	10.600	11.857
S3	1-5	0.085	3.470	24.700	28.255
S3	5-9	0.100	5.040	33.300	38.440
S3	9-13	0.000	0.173	1.770	1.943
S4	1-5	0.000	0.268	1.570	1.838
S4	5-9	0.000	0.000	0.463	0.463
S4	9-13	0.000	0.041	0.304	0.345
S5	1-5	0.074	5.440	17.600	23.114
S5	5-9	0.000	0.000	0.460	0.460
S5	9-13	0.000	0.000	0.130	0.130
S6	1-5	0.000	3.250	24.500	27.750
S6	5-9	0.000	0.397	1.890	2.287
S6	9-13	0.082	0.240	2.910	3.232
S7	1-5	0.000	0.000	0.128	0.128
S7	5-9	0.000	0.000	0.091	0.091
S7	9-13	0.000	0.000	0.111	0.111
S8	1-5	0.392	2.220	8.270	10.882
S8	5-9	0.000	0.131	5.820	5.951
S8	9-13	0.000	0.000	0.283	0.283
S9	1-5	0.000	0.193	5.530	5.723
S9	5-9	0.000	0.032	0.807	0.839
S9	9-13	0.000	0.000	0.781	0.781
S10	1-5	0.000	0.521	8.620	9.141
S10	5-9	0.000	0.434	10.800	11.234
S10	9-13	0.000	0.164	8.180	8.344

0 = COMPOUND BELOW DETECTION LIMITS

SHADED AREAS INDICATE LEVEL IS ABOVE EPA LIMIT FOR LEAKING UNDERGROUND TANKS

TABLE 5

## NAVY PIER HEADLANDS ANALYTICAL REPORT - TOTAL CARCINOGENIC PNAs (IN PPM)

LOCATION	DEPTH	BENZO(A)ANTHRACENE	BENZO(A)PYRENE	BENZO(B)FLUORANTHENE	BENZO(K)FLUORANTHENE	CHRYSENE	DIBENZO(AH)ANTHRACENE	INDENO(1,2,3-C,D)PYRENE	TOTAL CAR. PNAs
EPA LIMIT	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	0.004
I1	1-5	20.700	7.910	13.800	10.300	19.300	1.540	9.380	82.950
I1	5-9	0.424	0.160	0.324	0.224	0.443	0.027	0.149	1.751
I1	9-13	1.050	0.306	0.564	0.629	0.992	0.050	0.272	3.663
I2	1-5	3.150	1.250	2.050	1.830	3.150	0.200	1.250	12.880
I2	5-9	0.797	0.272	0.466	0.477	0.813	0.047	0.280	3.152
I2	9-13	8.220	1.010	1.820	1.520	2.870	0.181	1.120	11.741
I3	1-5	4.180	1.920	2.580	3.270	4.470	0.389	2.440	19.240
I3	5-9	0.965	0.325	0.408	0.386	1.400	0.000	0.277	3.781
I3	9-13	0.229	0.099	0.157	0.106	0.248	0.000	0.154	0.993
S1	1-5	9.740	3.330	5.780	3.630	10.100	0.603	3.890	37.073
S1	5-9	0.045	0.020	0.032	0.021	0.060	0.000	0.026	0.204
S1	9-13	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.013
S2	1-5	4.380	1.880	3.000	2.070	4.720	0.364	2.386	18.802
S2	5-9	25.200	8.940	11.800	15.500	29.100	1.750	10.900	103.190
S2	9-13	1.260	0.472	0.782	0.561	1.290	0.078	0.441	4.884
S3	1-5	7.120	2.400	3.770	2.570	7.080	0.517	3.380	26.987
S3	5-9	10.300	4.010	6.090	5.270	10.500	0.893	5.030	42.093
S3	9-13	0.387	0.189	0.274	0.184	0.424	0.023	0.163	1.644
S4	1-5	0.642	0.193	0.314	0.199	0.615	0.031	0.253	2.247
S4	5-9	0.030	0.000	0.000	0.000	0.039	0.000	0.000	0.066
S4	9-13	0.144	0.034	0.062	0.035	0.150	0.000	0.036	0.463
S5	1-5	14.900	6.020	12.200	6.870	15.200	0.605	2.620	58.415
S5	5-9	0.031	0.000	0.012	0.000	0.000	0.000	0.000	0.043
S5	9-13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
S6	1-5	6.150	1.950	3.790	2.130	5.950	0.539	1.860	22.160
S6	5-9	0.709	0.232	0.382	0.267	0.542	0.051	0.184	2.467
S6	9-13	0.606	0.255	0.354	0.329	0.586	0.050	0.207	2.389
S7	1-5	0.065	0.000	0.000	0.000	0.077	0.000	0.000	0.142
S7	5-9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
S7	9-13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
S8	1-5	5.760	2.420	5.140	2.090	5.830	0.313	1.010	22.583
S8	5-9	0.289	0.148	0.247	0.186	0.337	0.022	0.054	1.285
S8	9-13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
S9	1-5	0.382	0.188	0.347	0.234	0.418	0.028	0.105	1.702
S9	5-9	0.061	0.036	0.055	0.037	0.068	0.000	0.017	0.275
S9	9-13	0.051	0.000	0.019	0.013	0.058	0.000	0.000	0.141
S10	1-5	1.660	0.473	0.864	0.447	1.500	0.057	0.275	5.274
S10	5-9	0.974	0.432	0.863	0.436	0.958	0.054	0.218	3.935
S10	9-13	0.369	0.152	0.280	0.176	0.371	0.000	0.094	1.442

0 = COMPOUND BELOW DETECTION LIMITS

SHADED AREAS INDICATE LEVEL IS ABOVE EPA LIMIT FOR LEAKING TANKS

CONCENTRATIONS IN PARTS PER MILLION

## 9.0 CONCLUSIONS

The Phase II investigations targeted those areas where contaminants were suspected as a result of the findings of the Phase I investigation. Contaminants were found in most of the soils samples. Groundwater samples contained only isolated traces of contaminants, all below the groundwater limits.

Most, if not all of the soil removed from the area should be designated as "special waste". In some areas, where the level of contaminants exceeded the hazardous waste limits, the material will require disposal as "hazardous wastes". The following sections contain a more detailed discussion of the findings of the Phase II investigation.

## 9.1 SOILS

Analytical data generated by the Phase II investigations indicates that polynuclear aromatic hydrocarbons are present in the soil throughout most of the site. These contaminants in the soil are not included in the toxicity characteristic list in Part 261 of the hazardous waste regulations and therefore, are not "hazardous wastes". These compounds are considered "special" or industrial process wastes in the State of Illinois and, as a result, must be disposed of at a site that is permitted to accept such waste,

Benzene and heavy metals are also present in the soil (I3, S2, S6, and S7). In these areas, the concentration of heavy metals (Arsenic, Lead and Selenium) is at or above the EPA limit for hazardous wastes. Soil samples taken from borings I3 and S2 appear to have the highest concentrations of contaminants. Lead concentrations found in the 1-5 foot interval of I3 and in the 1-5 foot and 9-13 foot intervals of boring S2 were above the limits for hazardous wastes contained in 40 CFR Part 261. Selenium was found in concentrations at the limit for hazardous wastes in borings S6 and S7.

S2 is adjacent to Shoreline Marine. The Phase I investigation identified this area as being the location of one above ground tank and a suspected underground tank. In addition, a fueling area is present near this location. Boring location I3 was at the entrance to the gravel parking lot adjacent to Ogden Slip. The area along Ogden Slip is presently used as a mooring and service area for excursion boats. In both of these areas, it appears that present and/or past activities have resulted in some significant impacts to the project area. The selenium found in borings S6 and S7 may have resulted from past or present land use or may have been in the "fill" material used to construct the Headlands.

## 9.2 GROUNDWATER

Groundwater Quality Standards were promulgated by the State of Illinois on November 7, 1991. The Illinois Groundwater Protection Act was passed to protect, restore, and enhance the groundwaters of the State. Section 620 of the groundwater regulations states that "No person shall cause, threaten or allow the release of any contaminant to a resource groundwater such that:

- Treatment or additional treatment is necessary to continue an existing use or to assure a potential use of such groundwater; or
- An existing or potential use of such groundwater is precluded.

Section 620.401 of the Groundwater regulations contains concentrations of chemical constituents which cannot be exceeded in Class I groundwater. Analytical results of the groundwater samples taken from wells located at S1, S3, S6, S9 and S10 showed that detectable levels of volatile organic compounds were found. Very low concentrations of barium and chromium found at concentrations below the Illinois groundwater standards. PNAs were found only in monitoring well S10, also at concentrations below the groundwater limits.

Groundwater in the area was found to be only about 6 feet below ground. Measurements taken of the groundwater, showed that the groundwater elevation ranged from 4.77 feet at S10 in the center of the south Headlands to 0.43 feet at S9, at the north end of the Headlands. The Lake Michigan elevation was 0.6 feet and the Chicago River elevation was -1.8 feet. This indicates that groundwater is moving from the interior of the Headlands to the Lake or River depending on the adjacent waterbody. Recharge of the monitoring wells occurred almost instantaneously indicating that groundwater flow is fairly rapid.

### 9.3 CONSTRUCTION CONSIDERATIONS

Heavy metal concentrations exceeding the EPA limit for hazardous waste were found at boring locations I3 and S2. Concentrations which equal the EPA limit for selenium were found at S6 and S7. Any materials excavated from these areas may have concentrations at or above the EPA hazardous waste limit, in which case they must be treated as hazardous wastes. Disposal of hazardous waste such as these is a complicated and costly process. The Illinois EPA rules and regulations require that the soil be treated at a permitted facility prior to disposal. Disposal of materials such as these could cost between \$235 and \$300 per cubic yard excluding analytical and permitting costs.

Organic contaminants were found in soils throughout the site. Polynuclear Aromatic Hydrocarbons are not on the toxicity characteristic list for hazardous waste and do not exhibit any other hazardous characteristics, therefore soils contaminated with PNAs are not considered hazardous wastes. They are however, considered "special waste" by the Illinois EPA, and must be taken for disposal to specially permitted sites, accompanied by an Illinois manifest form. The Illinois EPA has set clean up objectives for these compounds in the leaking underground tank program. These objectives are only guidelines however. The Illinois EPA sets clean up objectives on a site specific basis during State regulated remediation actions.

State regulations on disposal of special and hazardous waste are set forth in Title 35: Environmental Protection, Subtitle G: Waste Disposal, Chapter I: Pollution Control Board. These regulations pertain to the generation, transportation, storage, treatment, and disposal of solid waste (garbage), special waste (industrial process wastes), and hazardous waste (as defined by the Resource Conservation and Recovery Act, and the Hazardous and Solid Waste Amendments). There are no specific rules and regulations in Title 35 that address situations such as the presence of contaminants on the Headlands.

Section 12 (A) of The Illinois Environmental Protection Act states that "*No person shall cause or threaten or allow the discharge of any contaminants into the environment in any State so as to cause or tend to cause water pollution in Illinois.*" The case is often made that the presence of contaminants in the soil endangers the groundwater quality since it is possible for the contaminants to leach into the groundwater. This depends greatly on the characteristics, and solubility of the contaminant and the individual situation.

It is suggested that the area occupied by Lake Shore Marine (the GSA property), the area adjacent to Rocky's Fish House, and Lake Point Towers be further investigated to determine more precisely, the extent of contamination. In addition consideration should be given to entering into a voluntary clean up in cooperation with the Illinois Environmental Protection Agency. The Illinois EPA would set site specific clean up objectives and standards for removal of contaminated material. Once the area was remediated to EPA specifications, EPA would provide a "clean letter" documenting their approval of the clean up.

Concentrations of heavy metals at or exceeding the limit for hazardous wastes were found four areas of the site. Any materials excavated or disturbed in these areas must be managed and disposed of as hazardous wastes in accordance with the rules and regulations governing hazardous waste generation, storage, and disposal/treatment. Transportation, treatment and disposal costs for hazardous wastes are typically in the neighborhood of \$300 per cubic yard.

The presence of organic contaminants in the soil results in these materials being designated as industrial or "special wastes". There are some requirements concerning the disposal of these materials, however, they are not as stringent as those for hazardous wastes. Soils excavated from the headlands should be evaluated and possibly tested further to determine the correct transportation and disposal alternatives. Costs for transportation and disposal of "special wastes" typically are approximately \$40 per cubic yard.

Alternatives for addressing contaminated areas of the site remaining after construction depend upon cleanup objectives and requirements set by the Illinois Environmental Protection Agency. Remedial measures could include continued periodic monitoring of the groundwater below the site, soil removal, bioremediation, an alternative technology, or a combination of these. Appendix D includes estimates of remedial actions based upon current knowledge of the site.

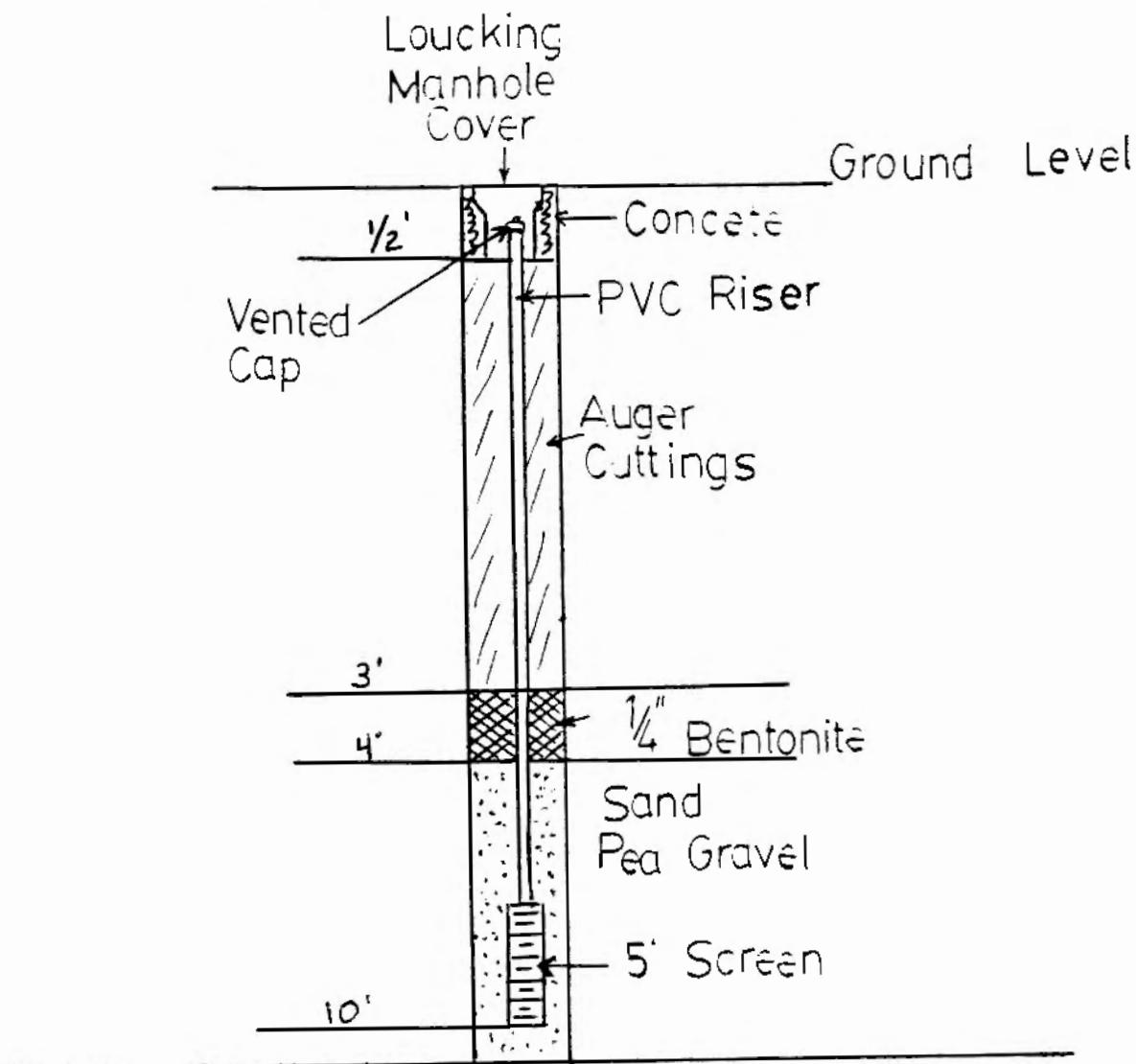
**APPENDIX A**

**MONITORING WELL DIAGRAM**

**BORING LOGS**

Well No. \_\_\_\_\_  
Date \_\_\_\_\_

O'BRIEN & ASSOCIATES, INC.  
CONSULTING ENGINEERS  
1235 E DAVIS ST/ARLINGTON HTS, IL 60005  
(312) 399-1441



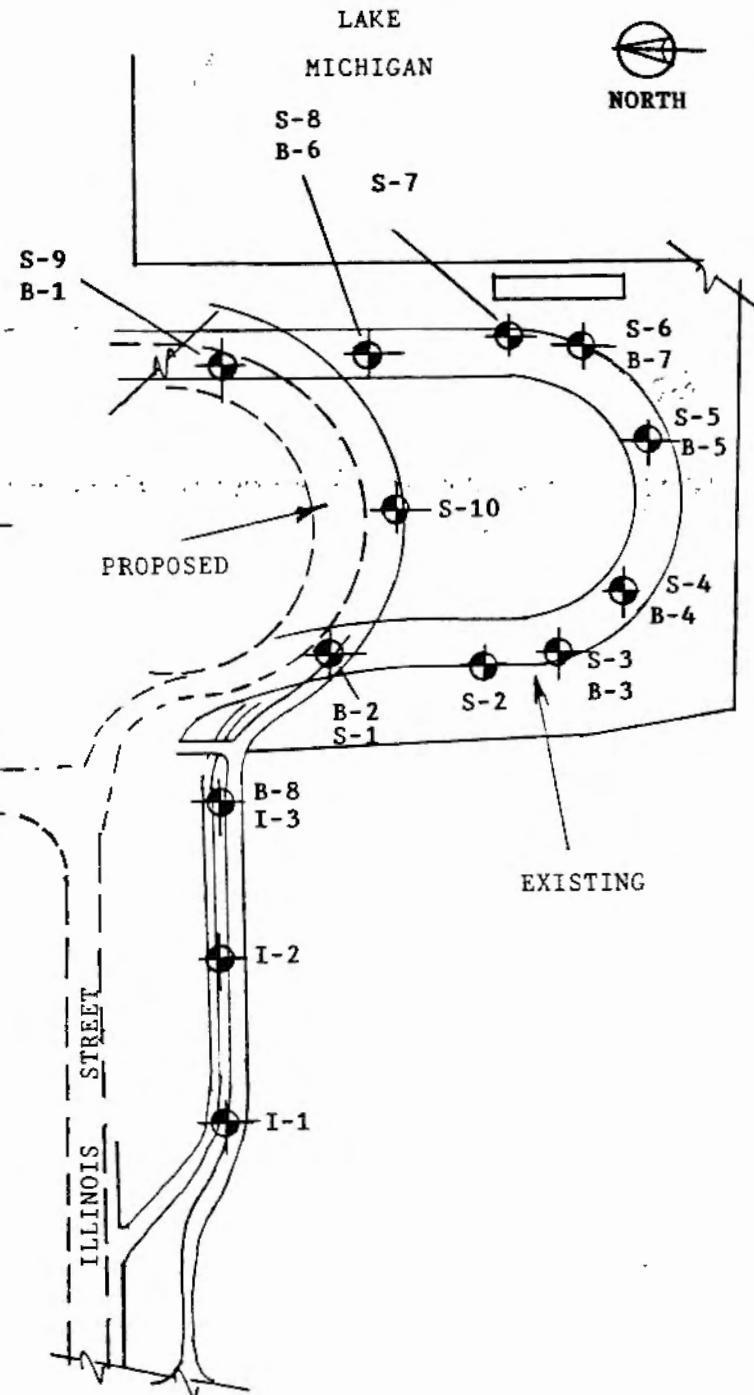
Notes

LAKE

MICHIGAN

BORING FOR  
PROPOSED  
TREE

GRAND AVENUE



NOTE: Borings S-1 through S-10  
and I-1 to I-3 Phase II  
Environmental Borings.

NOT TO SCALE

SOIL BORING LOCATION DIAGRAM

The Redevelopment of Navy Pier  
and the Headlands  
Chicago, Illinois

O'BRIEN & ASSOCIATES, INC.

CONSULTING ENGINEERS

P.O. BOX 1231

ARLINGTON HEIGHTS, ILLINOIS

(708) 398-1441

DRAWN BY CKB

APPROVED BY DOB

DATE 8-10-92

JOB NO. 92300

TECHNICIAN Eric SURFACE ELEV. \_\_\_\_\_  
 DRILLER Tom BORING STARTED Aug 12 1992  
 HELPER Mike BORING COMPLETED Aug 12 1992  
 RIG NO. CME55 STATION \_\_\_\_\_  
 OFF SET \_\_\_\_\_

**O'BRIEN & ASSOCIATES, INC.**  
**CONSULTING ENGINEERS**  
 1235 E. DAVIS ST/ARLINGTON HTS. IL 60005  
 (708) 398-1441

She \_\_\_\_\_  
**WATER LEVEL OBSERVATIONS**  
 WL 9' WS OR WD  
 WL \_\_\_\_\_ BCR \_\_\_\_\_ ACR  
 WL: AB HR. AB  
 WL: 24 Hr. AB

JOB NO. 92300			BORING NO. I-1		CLIENT		VOA	WEATHER		Sample No.	Depth or Elevation	Sampling Method	PENETRATION RECORD				Strata Change	Sample Description	ABBREVIATIONS																	
From	To		Split Spoon Blows				Length Recovered in Feet	Penetrometer Test in TSF					6"	6"	6"	6"			F.T.-Fish Tail																	
																				W.O.-Wash Out																
													S.T.-Shelby Tube							S.S.-Split Spoon																
0	1																			D.B.-Diamond Bit																
1	1	3	ss	14	20	30	23													P.A.-Power Auger																
2	3	5	ss	25	13	6	5													R.B.-Rock Bit																
3	5	7	ss	3	5	3	2													W.S.-While Sampling																
4	7	9	ss	3	4	3	3													W.D.-While Drilling																
5	9	11	ss	1	2	1	1													B.C.R.-Before Casing Removal																
6	11	13	ss	1	1	1	11													A.C.R.-After Casing Removal																
																				A.B.-After Boring																
																				DRILL CREW CHECK LIST																
																				Topsoil Thickness _____																
																				Fill Thickness _____																
																				CAVE IN LEVEL:																
																				While Drilling and Sampling _____																
																				After Boring Completion _____																
																				WATER LOSS:																
																				At _____ To _____																
																				Percent Loss _____																
																				At _____ To _____																
																				Percent Loss _____																
																				BOULDERS OR OBSTRUCTIONS:																
																				At _____ To _____																
																				At _____ To _____																
																				ARTESIAN PRESSURE:																
																				Depth _____																
																				Height of Soil Rise In Casing _____																
																				Piezometer PVC or SS																
																				Diameter _____ in.																
																				Screen Depth _____ ft to _____ ft																
																				Riser Pipe _____ ft to _____ ft																

TECHNICIAN Eric SURFACE ELEV.  
DRILLER Tom BORING STARTED Aug 12 1992  
HELPER Mike BORING COMPLETED Aug 12, 1992  
RIG NO. CME55 STATION  
OFF SET

O'BRIEN & ASSOCIATES, INC.

**CONSULTING ENGINEERS**  
1235 E. DAVIS ST./ARLINGTON HTS., IL 60005  
(708) 398-1441

WATER LEVEL OBSERVATIONS  
WL: 7 WS OR WD  
WL: \_\_\_\_\_ BCR \_\_\_\_\_ ACR  
WL: \_\_\_\_\_ AB \_\_\_\_\_ Hr. AB  
WL: 24 Hr. AB

#### **TECHNICAL**

TECHNICIAN        SURFACE ELEV.         
DRILLER Tom BORING STARTED Aug 12 1992  
HELPER Mike BORING COMPLETED Aug 12 1922  
RIG NO. CME55 STATION         
OFF SET

O'BRIEN & ASSOCIATES, INC.

## **CONSULTING ENGINEERS**

1235 E. DAVIS ST./ARLINGTON HTS., IL 60005

[708] 398-1441

(7-52) 1960-1961

## WATER LEVEL OBSERVATIONS

W1 9 WS DR WD

W.E.:        W.S. OR H.D.

W1 : BCR ACR

TE:\_\_\_\_\_ BCR:\_\_\_\_\_ ACR

WL: \_\_\_\_\_ AB \_\_\_\_\_

### 24 Hr. AB

TECHNICIAN Eric SURFACE ELEV. \_\_\_\_\_  
 DRILLER Tom BORING STARTED Aug 13, 1992  
 HELPER Mike BORING COMPLETED Aug 13, 1992  
 RIG NO. CME55 STATION \_\_\_\_\_  
 OFF SET \_\_\_\_\_

O'BRIEN & ASSOCIATES, INC.  
 CONSULTING ENGINEERS  
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 (708) 398-1441

WATER LEVEL OBSERVATIONS  
 WL: 7' WS OR WD  
 WL: BCR ACR  
 WL: 6' AB Hr. AB  
 WL: 24 Hr. AB

JOB NO. 92300		BORING NO.	S-1	CLIENT	VOA	WEATHER		ABBREVIATIONS F.T.-Fish Tail W.O.-Wash Out S.T.-Shelby Tube S.S.-Split Spoon D.B.-Diamond Bit P.A.-Power Auger R.B.-Rock Bit W.S.-While Sampling W.D.-While Drilling B.C.R.-Before Casing Removal A.C.R.-After Casing Removal A.B.-After Boring								
Sample No.	Depth or Elevation	Sampling Method	PENETRATION RECORD				R	Qp	Length Recovered in Feet	Penetrometer Test in PSF	Strata Change					
			Split Spoon Blows						6"	6"	6"	6"				
From	To	Sampling Method	2 Feet													
0	1												Sample Description			
1	1	ss	21	16	14	11	10		11'	Misc. fill with gravel			Asphalt 3" Base 8"			
2	3	ss	8	3	2	2	13	-		Misc fill w/gravel						
3	5	ss	2	1	1	1	11"			Misc fillw/gray fine sand						
4	7	ss	1	1	1	2	7	.25	7'	Gray silty clay-tr. sand & gravel						
5	9	ss	1	2	1	1	8"	.25		Gray silty clay-tr. sand & gravel						
6	11	ss	1	1	2	2	1'	0		Gray silty clay-tr. sand & gravel						
End of boring																
BOULDERS OR OBSTRUCTIONS:																
ARTESIAN PRESSURE:																
PIEROMETER PVC or ss																
Diameter 2 in.																
Screen Depth 5 ft to /0 ft																
Riser Pipe 0 ft to 5 ft																



TECHNICIAN Eric SURFACE ELEV.  
 DRILLER Tom BORING STARTED Aug 13 1992  
 HELPER Mike BORING COMPLETED Aug 13, 1992  
 RIG NO. CME55 STATION  
 OFF SET

**O'BRIEN & ASSOCIATES, INC.**  
**CONSULTING ENGINEERS**  
 1235 E. DAVIS ST/ARLINGTON HTS. IL 60005  
 (708) 398-1441

Sheet \_\_\_\_\_  
**WATER LEVEL OBSERVATIONS**  
 WL: 8' WS OR WD  
 WL: BCR ACR  
 WL: AB Hr. AB  
 WL: 24 Hr. AB

JOB NO. 92300		BORING NOS-3		CLIENT		VOA		WEATHER		ABBREVIATIONS F.T.-Fish Tail W.O.-Wash Out S.T.-Shelby Tube S.S.-Split Spoon D.B.-Diamond Bit P.A.-Power Auger R.B.-Rock Bit W.S.-While Sampling W.D.-While Drilling B.C.R.-Before Casing Removal A.C.R.-After Casing Removal A.B.-After Boring			
Sample No.	Depth or Elevation	Sampling Method	PENETRATION RECORD				R	Qp	Strata Change				
			Split Spoon Blows										
	From	To	6"	6"	6"	6"							
			← 2 Feet →				Length Recovered in Feet	Penetrometer Test in TSF					
0	1												
1	1	3	ss	19	11	15	19	18"	-	Black cinder - tr. 1" stone			
2	3	5	ss	5	12	6	6	19"	-	3' Misc fill-tr. gray fine sand at 4'			
3	5	7	ss	15	19	23	12	8"	=	5' Misc fill w/black cinders			
4	7	9	ss	3	1	1	1	2-1/2"	-	7' Misc fill			
5	9	11	ss	1	2	3	1	9-1/2"	0	Misc. fill at 9' gray clay at 9-1/2'			
6	11	13	ss	2	1	1	1	15"	11'	Fine gray sand			
										End of boring			
										ARTESIAN PRESSURE:			
										Depth _____			
										Height of Soil Rise In Casing _____			
										Piezometer PVC or SS			
										Diameter 2 in.			
										Screen Depth 5 ft to 10 ft			
										Riser Pipe 0 ft to 5 ft			

TECHNICIAN Eric

SURFACE ELEV.

DRILLER Tom

BORING STARTED Aug 13 1992

HELPER Mike

BORING COMPLETED Augs 13, 1922

RIG NO. CME55

STATION

OFF SET

## O'BRIEN &amp; ASSOCIATES, INC.

CONSULTING ENGINEERS

1235 E. DAVIS ST/ARLINGTON HTS, IL 60005

(708) 398-1441

## WATER LEVEL OBSERVATIONS

WL: 9' WS OR WD

WL: BCR ACR

WL: AB Hr. AB

WL: 24 Hr. AB

JOB NO. 92300

BORING NO. S-4

CLIENT

CASING USED HS

SIZE 3-1/4ID

3-1/4ID

SIZE 3-1/4ID

3-1/4ID

SIZE 3-1/4ID

3-1/4ID

SIZE 3-1/4ID

3-1/4ID

## ABBREVIATIONS

F.T.-Fish Tail

W.O.-Wash Out

S.T.-Shelby Tube

S.S.-Split Spoon

D.B.-Diamond Bit

P.A.-Power Auger

R.B.-Rock Bit

W.S.-While Sampling

W.D.-While Drilling

B.C.R.-Before Casing Removal

A.C.R.-After Casing Removal

A.B.-After Boring

## DRILL CREW CHECK LIST

Topsoil Thickness \_\_\_\_\_

Fill Thickness \_\_\_\_\_

## CAVE IN LEVEL:

While Drilling and Sampling \_\_\_\_\_

After Boring Completion \_\_\_\_\_

## WATER LOSS:

At \_\_\_\_\_ To \_\_\_\_\_

Percent Loss \_\_\_\_\_

At \_\_\_\_\_ To \_\_\_\_\_

Percent Loss \_\_\_\_\_

## BOULDERS OR OBSTRUCTIONS:

At \_\_\_\_\_ To \_\_\_\_\_

At \_\_\_\_\_ To \_\_\_\_\_

## ARTESIAN PRESSURE:

Depth \_\_\_\_\_

Height of Soil Rise In Casing \_\_\_\_\_

Piezometer PVC or SS

Diameter \_\_\_\_\_ in.

Screen Depth \_\_\_\_\_ ft to \_\_\_\_\_ ft

Riser Pipe \_\_\_\_\_ ft to \_\_\_\_\_ ft

Sample No.	Depth or Elevation		Sampling Method	PENETRATION RECORD				R Length Recovered in Feet	Qp Penetrometer Test in TSF	Strata Change	WEATHER					
				Split Spoon Blows												
	From	To		6"	6"	6"	6"									
	← 2 Feet →															
1	0	1	ss	15	12	14	29	16"	-		Misc fill					
2	3	5	ss	7	8	7	8	10"	-		Misc. fill					
3	5	7	ss	5	4	2	4	9"	.75	5'	Gray silty clay					
4	7	9	ss	1	2	2	2	15"	.25		Gray silty clay - tr. sand					
5	9	11	ss	2	1	1	1	8"	-	9'	Gray fine sand					
6	11	13	ss	1	2	1	1	8"			Gray find sand					
											End of boring					



TECHNICIAN Mike SURFACE ELEV. \_\_\_\_\_  
DRILLER Tom BORING STARTED Aug 17 1992  
HELPER \_\_\_\_\_ BORING COMPLETED Aug 17, 1992  
RIG NO. CME55 STATION \_\_\_\_\_  
OFF SET \_\_\_\_\_

O'BRIEN & ASSOCIATES, INC.

**CONSULTING ENGINEERS**  
1235 E. DAVIS ST./ARLINGTON HTS., IL 60005  
[708] 399-1441

## WATER LEVEL OBSERVATIONS

WI : WS OR WD

W1 : \_\_\_\_\_ BCR \_\_\_\_\_ ACR

WL: \_\_\_\_\_ AB \_\_\_\_\_ Hr. AB

WL: \_\_\_\_\_ 24 Hr. AB

**TECHNICIAN**

TECHNICIAN        SURFACE ELEV.         
DRILLER Tom BORING STARTED Aug 17 1992  
HELPER        BORING COMPLETED Aug 17 1992  
RIG NO. CME55 STATION         
OFF SET

O'BRIEN & ASSOCIATES, INC.

**CONSULTING ENGINEERS**  
1235 E. DAVIS ST/ARLINGTON HTS, IL 60005  
(708) 398-1441

## WATER LEVEL OBSERVATIONS

WL: 8 WS OR WD  
WL: \_\_\_\_\_ BCR \_\_\_\_\_ ACR  
WL: \_\_\_\_\_ AB \_\_\_\_\_ Hr. AB  
WL: 24 Hr. AB

JOB NO. 92300

JOB NO. 92300 BORING NO. S-7 CLIENT VOA WEATHER ABBREVIATIONS  
ET Elevation TEL Telephone

JOB NO. 92300 BORING NO. S-7 CLIENT

CASING USED \_\_\_\_\_ SIZE 3-1/4 ID WL: 24 Hr. AB

TECHNICIAN Mike SURFACE ELEV. \_\_\_\_\_  
 DRILLER Tom BORING STARTED Aug 17 1992  
 HELPER \_\_\_\_\_ BORING COMPLETED Aug 17 1922  
 RIG NO. CME55 STATION \_\_\_\_\_  
 OFF SET \_\_\_\_\_

O'BRIEN & ASSOCIATES, INC.  
 CONSULTING ENGINEERS  
 1235 E. DAVIS ST./ARLINGTON HTS., IL 60005  
 (708) 398-1441

WATER LEVEL OBSERVATIONS  
 WL: WS OR WD  
 WL: BCR ACR  
 WL: AB Hr. AB  
 WL: 24 Hr. AB

JOB NO. 92300 BORING NO. S 8 CLIENT VOA WEATHER \_\_\_\_\_

Sample No.	Depth or Elevation		PENETRATION RECORD				R	Qp	Length Recovered in Feet	Penetrometer Test in TSF	Strata Change	Sample Description						
	From	To	Split Spoon Blows															
			6"	6"	6"	6"												
			← 2 Feet →															
1	0	1	ss	50	25	10	12					Fill						
2	3	5	ss	3	2	2	2					Fill						
3	5	7	ss	1	1	2	3					Fill						
4	7	9	ss	2	1	1	3					Gray fine sand at 7						
5	9	11	ss	2	2	1	1					Gray fine sand						
6	11	13	ss	1	1	2	2					Gray silty clay						
												End of boring						

ABBREVIATIONS  
 F.T.-Fish Tail  
 W.O.-Wash Out  
 S.T.-Shelby Tube  
 S.S.-Split Spoon  
 D.B.-Diamond Bit  
 P.A.-Power Auger  
 R.B.-Rock Bit  
 W.S.-While Sampling  
 W.D.-While Drilling  
 B.C.R.-Before Casing Removal  
 A.C.R.-After Casing Removal  
 A.B.-After Boring

#### DRILL CREW CHECK LIST

Topsill Thickness \_\_\_\_\_

Fill Thickness \_\_\_\_\_

#### CAVE IN LEVEL:

While Drilling and Sampling \_\_\_\_\_

After Boring Completion \_\_\_\_\_

#### WATER LOSS:

At \_\_\_\_\_ To \_\_\_\_\_

Percent Loss \_\_\_\_\_

At \_\_\_\_\_ To \_\_\_\_\_

Percent Loss \_\_\_\_\_

#### BOULDERS OR OBSTRUCTIONS:

At \_\_\_\_\_ To \_\_\_\_\_

At \_\_\_\_\_ To \_\_\_\_\_

#### ARTESIAN PRESSURE:

Depth \_\_\_\_\_

Height of Soil Rise In Casing \_\_\_\_\_

PIZOMETER PVC or SS

Diameter \_\_\_\_\_ in.

Screen Depth \_\_\_\_\_ ft to \_\_\_\_\_ ft

Riser Pipe \_\_\_\_\_ ft to \_\_\_\_\_ ft

TECHNICIAN Doug SURFACE ELEV.  
 DRILLER Tom BORING STARTED Aug 18 1992  
 HELPER Mike BORING COMPLETED Aug 18, 1992  
 RIG NO. CME55 STATION  
 OFF SET

O'BRIEN & ASSOCIATES, INC.  
 CONSULTING ENGINEERS  
 1235 E. DAVIS ST/ARLINGTON HTS, IL 60005  
 (708)398-1441

WATER LEVEL OBSERVATIONS  
 WL: 8 WS OR WD  
 WL: BCR ACR  
 WL: AB Hr. AB  
 WL: 24 Hr. AB

JOB NO. 92300		BORING NO. S-9	CLIENT	VOA	WEATHER										
Sample No.	Depth or Elevation	Sampling Method	PENETRATION RECORD				R	Qp	Length Recovered in Feet	Penetrometer Test in TSF	Strata Change	Sample Description	ABBREVIATIONS		
	From		Split Spoon Blows						6"	6"	6"	6"	F.T.-Fish Tail		
	To		Split Spoon Blows						Length Recovered in Feet	Penetrometer Test in TSF	Strata Change	Sample Description	W.O.-Wash Out		
0	1											Ashphalt	S.T.-Shelby Tube		
1	1	3	ss	15	16	8	6	12"	-			Black sand	S.S.-Split Spoon		
2	3	5	ss	2	4	4	3	5"				Gray clay	D.B.-Diamond Bit		
3	5	7	ss	2	2	2	2	8:	-			Gray clay	P.A.-Power Auger		
4	7	9	ss	1	2	1	2	13"				Gray clay	R.B.-Rock Bit		
5	9	11	ss	1	2	2	1	10"	-			Gray clay	W.S.-While Sampling		
6	11	13	ss	1	1	1	1	15"				Gray clay	W.D.-While Drilling		
												End of boring	B.C.R.-Before Casing Removal		
													A.C.R.-After Casing Removal		
													A.B.-After Boring		
													DRILL CREW CHECK LIST		
													Topsoil Thickness		
													Fill Thickness		
													CAVE IN LEVEL:		
													While Drilling and Sampling		
													After Boring Completion		
													WATER LOSS:		
													At To		
													Percent Loss		
													At To		
													Percent Loss		
													BOULDERS OR OBSTRUCTIONS:		
													At To		
													At To		
													ARTESIAN PRESSURE:		
													Depth		
													Height of Soil Rise In Casing		
													Piezometer PVC or SS		
													Diameter 2 in.		
													Screen Depth 10 ft to 5 ft		
													Riser Pipe 5 ft to 0 ft		

TECHNICIAN	Doug	SURFACE ELEV.
DRILLER	Tom	BORING STARTED Aug 18 1992
HELPER	Mike	BORING COMPLETED Aug 18, 1992
RIG NO.	CME55	STATION _____
		OFF SET _____

O'BRIEN & ASSOCIATES, INC.

**CONSULTING ENGINEERS**

1235 E. DAVIS ST./Arlington HTS., IL 60005

ENV/W/S, E 855  
(708) 398-1441

## WATER LEVEL OBSERVATIONS

W1 : WS OR WD

WL: \_\_\_\_\_ BCR \_\_\_\_\_ ACR \_\_\_\_\_

WL: \_\_\_\_\_ AB \_\_\_\_\_ Kr. AB

WL: \_\_\_\_\_ 24 Hr. AB

TECHNICIAN Doug

SURFACE ELEV. \_\_\_\_\_

DRILLER Tom BORING STARTED 8-18-92

HELPER Mike BORING COMPLETED 8-18-92

RIG NO. STATION \_\_\_\_\_

OFF SET \_\_\_\_\_

**O'BRIEN & ASSOCIATES, INC.****CONSULTING ENGINEERS**

1235 E. DAVIS ST/ARLINGTON HTS, IL 60005

(708) 398-1441

**WATER LEVEL OBSERVATIONS**

WL: WS OR WD

WL: BCR ACR

WL: AB Hr. AB

WL: 24 Hr. AB

JOB NO. 92300

BORING NO. Tree Boring

CLIENT

VOA

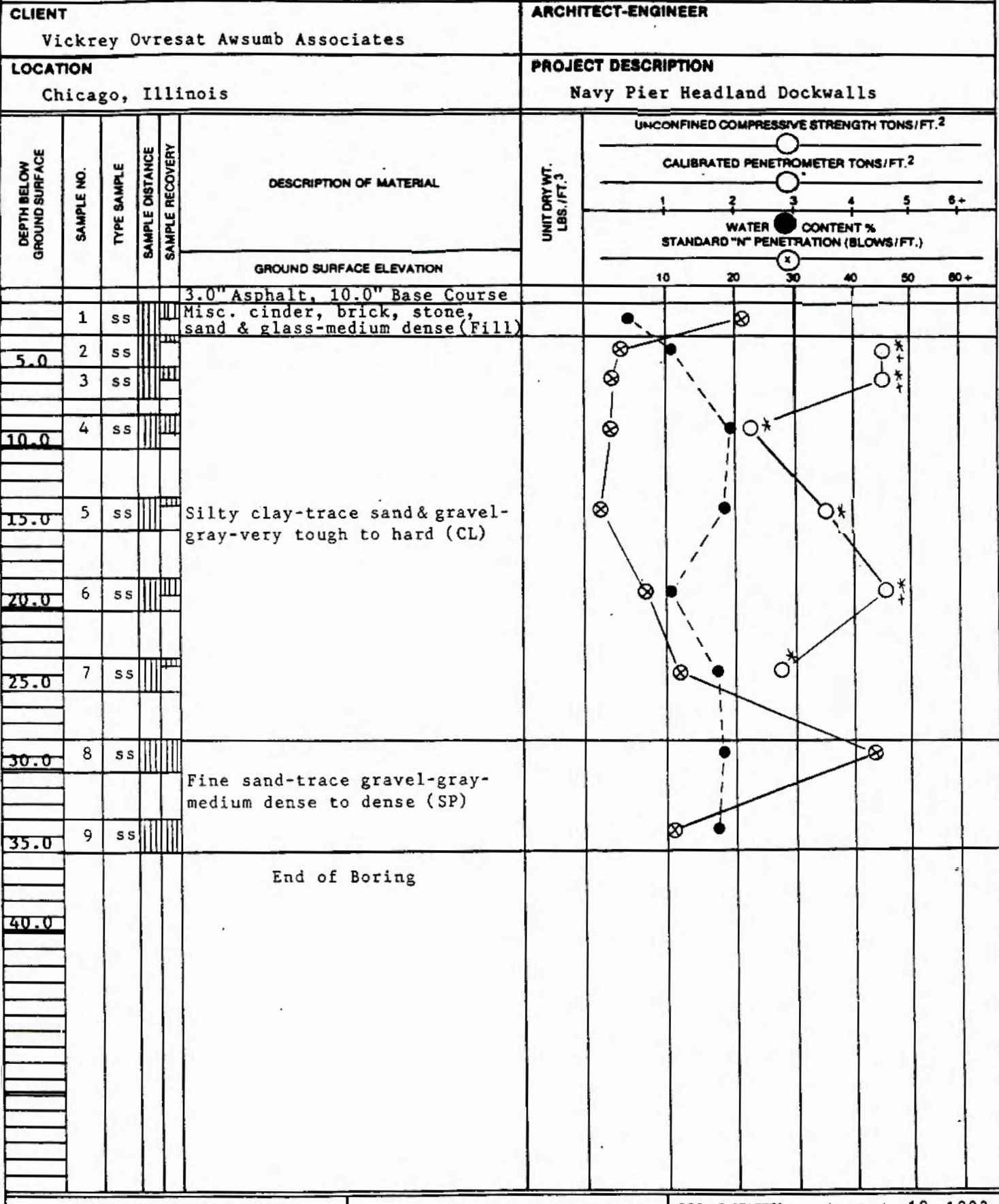
WEATHER

**ABBREVIATIONS**

F.T.-Fish Tail  
 W.O.-Wash Out  
 S.T.-Shelby Tube  
 S.S.-Split Spoon  
 D.B.-Diamond Bit  
 P.A.-Power Auger  
 R.B.-Rock Blt  
 W.S.-While Sampling  
 W.D.-While Drilling  
 I.C.R.-Before Casing Removal  
 A.C.R.-After Casing Removal  
 A.B.-After Boring

Sample No.	Depth or Elevation		Sampling Method	PENETRATION RECORD				R	Qp	Length Recovered in Feet	Penetrometer Test in TSF	Strata Change	Sample Description	VOA	WEATHER									
	Split Spoon Blows																							
	From	To		6"	6"	6"	6"																	
1	0	3	PA										CA-6											
2	8	10	PA										CA-6											
3	12	15											12' Gray silty clay-tr. sand& gravel											
														End of boring										
														dry										
															WATER LOSS:									
														At _____ To _____										
														Percent Loss _____										
														At _____ To _____										
														Percent Loss _____										
														BOULDERS OR OBSTRUCTIONS:										
														At _____ To _____										
														At _____ To _____										
														ARTESIAN PRESSURE:										
														Depth _____										
														Height of Soil Rise In Casing _____										
														Piezometer PVC or SS										
														Diameter _____ in.										
														Screen Depth _____ ft to _____ ft										
														Riser Pipe _____ ft to _____ ft										

# LOG OF BORING NO. B-1



# LOG OF BORING NO. B-2

CLIENT Vickrey Ovresat Awsumb Associates					ARCHITECT-ENGINEER					
LOCATION Chicago, Illinois					PROJECT DESCRIPTION Navy Pier Headland Dockwalls					
DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	SAMPLE RECOVERY	DESCRIPTION OF MATERIAL					
					GROUND SURFACE ELEVATION 3.25" Asphalt. 8.0" Base Course					
	1	ss			Misc. cinder, brick, stone, sand, wood & topsoil-loose to medium dense (Fill)					
5.0	2	ss								
	3	ss								
10.0	4	ss			Silty clay-trace sand & gravel-gray-soft (CL) Wet					
	5	st								
20.0	6	st			Silty clay-trace sand & gravel-gray-very tough (CL)					
	7	st								
25.0					Fine sand-trace gravel-gray-medium dense (SP)					
30.0	8	ss								
	9	ss			Silty clay-trace sand & gravel-gray-tough (CL)					
35.0					End of Boring					
40.0										
WATER LEVEL OBSERVATIONS					O'BRIEN & ASSOCIATES, INC.					
W.L.	7.0' wd				Consulting Engineers					
W.L.	17.0' bcr				ARLINGTON HEIGHTS, ILLINOIS					
	12.0' acr				(708) 398-1441					
BORING STARTED August 11, 1992					BORING COMPLETED August 11, 1992					
RIG	CME 55	FOREMAN TOB								
DRAWN	JD	APPROVED DOB								
JOB #	92300-1	SHEET 1 of 1								

# LOG OF BORING NO. B-3

CLIENT Vickrey Ovresat Awsumb Associates					ARCHITECT-ENGINEER									
LOCATION Chicago, Illinois					PROJECT DESCRIPTION Navy Pier Headland Dockwalls									
DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	SAMPLE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>							
							1	2	3	4	5	6+		
					GROUND SURFACE ELEVATION		WATER	CONTENT %	STANDARD "N" PENETRATION (BLOWS/FT.)					
					7.5" Asphalt, 7.5" Base Course				10	20	30	40	50	60+
5.0	1	ss			Misc. cinder, brick, stone, sand, topsoil & clay-loose to medium dense (Fill)									
10.0	2	ss												
15.0	3	ss												
20.0	4	ss												
25.0	5	ss			Silty clay-trace sand & gravel-gray-soft (CH-OH) Wet									
30.0	6	st			Fine sand-trace wood & silt-loose (SP-SM)									
35.0	7	ss												
40.0	8	ss			Silty sand-gray-loose to medium dense (SP-SM)									
	9	ss			End of Boring									
WATER LEVEL OBSERVATIONS					O'BRIEN & ASSOCIATES, INC.			BORING STARTED August 11, 1992						
W.L.	8.0' wd				Consulting Engineers			BORING COMPLETED August 11, 1992						
W.L.	25.0' bcr				ARLINGTON HEIGHTS, ILLINOIS			RIG CME 55 FOREMAN TOB						
	7.0' acr				(708) 398-1441			DRAWN JD APPROVED DOB						
					JOB # 92300-1 SHEET 1 of 1									

# LOG OF BORING NO. B-4

CLIENT Vickrey Ovresat Awsumb Associates					ARCHITECT-ENGINEER				
LOCATION Chicago, Illinois					PROJECT DESCRIPTION Navy Pier Headland Dockwalls				
DEPTH BELOW GROUND SURFACE					UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>				
SAMPLE NO.					CALIBRATED PENETROMETER TONS/FT. <sup>2</sup>				
DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	SAMPLE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>	CALIBRATED PENETROMETER TONS/FT. <sup>2</sup>	WATER CONTENT %
GROUND SURFACE ELEVATION					STANDARD "N" PENETRATION (BLOWS/FT.)				
2.5" Asphalt, 10.0" Base Course					10 20 30 40 50 60+				
5.0					Misc. cinder, sand, stone & clay-loose (Fill)				
10.0					Silty clay-trace sand & gravel-gray-tough (CL)				
15.0					Fine sand-trace gravel-gray-loose (SP)				
20.0					Fine sand-trace silt-gray-loose to medium dense (SP-SM)				
25.0					Silty clay-trace sand & gravel-gray-soft (CL)				
30.0					End of Boring				
35.0									
40.0									
WATER LEVEL OBSERVATIONS					O'BRIEN & ASSOCIATES, INC.				
W.L.	17.0' wd				Consulting Engineers				
W.L.	25.0' bcr				ARLINGTON HEIGHTS, ILLINOIS				
	6.0' acr				(708) 398-1441				
BORING STARTED August 11, 1992					BORING COMPLETED August 11, 1992				
RIG	CME 55				FOREMAN TOB				
DRAWN	JD				APPROVED DOB				
JOB #	92300-1				SHEET 1 of 1				

# LOG OF BORING NO. B-5

CLIENT Vickrey Ovresat Awsumb Associates					ARCHITECT-ENGINEER				
LOCATION Chicago, Illinois					PROJECT DESCRIPTION Navy Pier Headland Dockwalls				
DEPTH BELOW GROUND SURFACE					UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>				
SAMPLE NO.					CALIBRATED PENETROMETER TONS/FT. <sup>2</sup>				
TYPE SAMPLE					UNIT DRY WT. LBS./FT. <sup>3</sup>				
SAMPLE DISTANCE					1 2 3 4 5 6+				
SAMPLE RECOVERY					WATER CONTENT %				
DESCRIPTION OF MATERIAL					STANDARD "N" PENETRATION (BLOWS/FT.)				
GROUND SURFACE ELEVATION					10 20 30 40 50 60+				
2.5" Asphalt, 9.0" Base Course									
5.0									
1 1 ss Misc. cinder, sand, topsoil & clay-loose to medium dense (Fill)									
10.0									
3 1 ss Silty clay-trace sand & gravel-gray-tough to very tough (CL)									
15.0									
4 1 st Silty clay-trace sand & gravel-gray-soft (CL)									
20.0									
5 1 st Silty clay-trace sand & gravel-gray-very tough (CL)									
25.0									
7 1 ss Fine sand-trace gravel-gray-medium dense (SP)									
30.0									
8 1 ss Fine sand-trace silt-gray-loose to medium dense (SP-SM)									
35.0									
End of Boring									
40.0									
WATER LEVEL OBSERVATIONS					O'BRIEN & ASSOCIATES, INC.				
W.L.	23.0'	wd			Consulting Engineers				
W.L.	33.0'	bcr			ARLINGTON HEIGHTS, ILLINOIS				
	6.0'	acr			(708) 398-1441				
BORING STARTED August 14, 1992					BORING COMPLETED August 14, 1992				
RIG	CME 55				FOREMAN	TOB			
DRAWN	JD				APPROVED	DOB			
JOB #	92300-1				SHEET	1 of 1			

# LOG OF BORING NO. B-6

CLIENT Vickrey Ovresat Awsumb Associates					ARCHITECT-ENGINEER					
LOCATION Chicago, Illinois					PROJECT DESCRIPTION Navy Pier Headland Dockwalls					
DEPTH BELOW GROUND SURFACE					UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>					
SAMPLE NO.					CALIBRATED PENETROMETER TONS/FT. <sup>2</sup>					
TYPE SAMPLE					UNIT DRY WT. LBS./FT. <sup>3</sup>					
SAMPLE DISTANCE					1 2 3 4 5 6+					
SAMPLE RECOVERY					WATER CONTENT %					
DESCRIPTION OF MATERIAL					STANDARD "N" PENETRATION (BLOWS/FT.)					
GROUND SURFACE ELEVATION					10 20 30 40 50 60+					
3.0" Asphalt, 8.0" Base Course										
Misc. cinder, sand, brick, clay & topsoil-loose to medium dense (Fill)										
5.0 1 ss										
5.0 2 ss										
5.0 3 ss										
10.0 4 st										
15.0 5 ss										
20.0 6 ss										
25.0 7 ss										
30.0 8 ss										
35.0 9 ss										
End of Boring										
40.0										
WATER LEVEL OBSERVATIONS					O'BRIEN & ASSOCIATES, INC.					
W.L.	dry				Consulting Engineers					
W.L.					ARLINGTON HEIGHTS, ILLINOIS					
					(708) 398-1441					
BORING STARTED August 14, 1992					BORING COMPLETED August 14, 1992					
RIG	CME 55		FOREMAN TOB							
DRAWN	JD		APPROVED DOB							
JOB #	92300-1				SHEET	1 of 1				

# LOG OF BORING NO. B-7

CLIENT					ARCHITECT-ENGINEER											
Vickrey Ovresat Awsumb Associates																
LOCATION					PROJECT DESCRIPTION											
Chicago, Illinois					Navy Pier Headland Dockwalls											
DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	SAMPLE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>									
							1	2	3	4	5	6+				
GROUND SURFACE ELEVATION					CALIBRATED PENETROMETER TONS/FT. <sup>2</sup>					WATER CONTENT %						
					STANDARD "N" PENETRATION (BLOWS/FT.)					(X)						
					10 20 30 40 50 60+											
					2.0" Asphalt, 10.0" Base Course											
	1	ss			Misc. cinder, topsoil, stone, sand & clay-loose (Fill) Strong petroleum odors & free product		(X)									
5.0	2	ss			Silty clay-trace sand & gravel-gray-soft (CL) Wet		(X)									
	3	ss			Fine sand-trace silt-gray-loose (SP-SM)		(X)									
	4	ss					(X)									
10.0	5	ss			Silty clay-trace sand & gravel-gray-tough to very tough (CL)		(X)									
	6	ss					(X)									
15.0	7	ss			Fine sand-trace silt-gray-medium dense (SP-SM)		(X)									
	8	ss			Silty clay-trace sand & gravel-gray-soft (CL)		(X)									
	9	ss			Fine sand-trace silt-gray-medium dense (SP-SM)											
					End of Boring											
40.0																

## WATER LEVEL OBSERVATIONS

W.L. 8.0' wd

O'BRIEN & ASSOCIATES, INC.

Consulting Engineers

ARLINGTON HEIGHTS, ILLINOIS

(708) 398-1441

BORING STARTED August 18, 1992

BORING COMPLETED August 18, 1992

RIG CME 55 FOREMAN TOB

DRAWN JD APPROVED DOB

JOB # 92300-1 SHEET 1 of 1

# LOG OF BORING NO. B-8

CLIENT Vickrey Ovresat Awsumb Associates					ARCHITECT-ENGINEER				
LOCATION Chicago, Illinois					PROJECT DESCRIPTION Navy Pier Headland Dockwalls				
DEPTH BELOW GROUND SURFACE	SAMPLE NO.	TYPE SAMPLE	SAMPLE DISTANCE	SAMPLE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. <sup>2</sup>	CALIBRATED PENETROMETER TONS/FT. <sup>2</sup>	WATER CONTENT %
					GROUND SURFACE ELEVATION				STANDARD "N" PENETRATION (BLOWS/FT.)
5.0	1	ss			Gravel & Stone Base Course				10 20 30 40 50 60+
	2	ss			Misc. cinder, sand, brick & clay-loose to medium dense (Fill)				
10.0	3	ss			Misc. gravel, stone & clay-dense (Fill)				
12.0	4	ss			End of Boring Auger refusal at 12.0' Possible concrete obstruction				
15.0									
20.0									
25.0									
30.0									
35.0									
40.0									
WATER LEVEL OBSERVATIONS					O'BRIEN & ASSOCIATES, INC.		BORING STARTED August 18, 1992		
W.L.	11.0' wd				Consulting Engineers		BORING COMPLETED August 18, 1992		
W.L.					ARLINGTON HEIGHTS, ILLINOIS		RIG CME 55	FOREMAN TOB	
					(708) 398-1441		DRAWN JD	APPROVED DOB	
							JOB # 92300-1	SHEET 1 of 1	

**APPENDIX B**  
**SOILS ANALYSIS**

PROJECT NUMBER 3639

DATE WORK IN 8/13/92

REPORT TO \_\_\_\_\_

Page 1 of 2

REQUESTED BY L Cirello

RECEIVED BY \_\_\_\_\_

DATE REQUIRED \_\_\_\_\_

SPECIAL INSTRUCTIONS: BILL VOA Directly. Contact L Cirello for directions

ITEM	LAB NO.	SITE CODE SAMPLE DESCRIPTION	DATE COLLECTED	PRESERV.	CONTAINER	ANALYSES REQUESTED					COMMENTS
						BENT	PHTA	TCLP	PCB	PCDD	
1	I1 1-3	1-3 ft Deep	8/12/92	None	4oz glass						Please composit I1 1-3
2	I1 3-5	3-5 ft Deep	8/12								and I1 3-5 and analyze
3	I1 5-9	5-9 ft Deep	8/12								
4	I1 9-13	9-13 ft Deep	8/12								
5	I2 1-5	1-5 ft deep	8/12								
6	I2 5-9	5-9 ft deep	8/12								
7	I2 9-13	9-13 ft depth	8/12								
8	I3 1-5	1-5 "	8/12								
9	I3 5-9	5-9	8/12								
10	I3 9-13	9-13	8/12								
11	S1 1-5	1-5	8/13								
12	S1 5-9	5-9									
13	S1 9-13	9-13									
14	S2 1-5	1-5									
15	S2 5-9	5-9									
16	S2 9-13	9-13									
17	S3 1-5	1-5									
18	S3 5-9	5-9									
19	S3 9-13	9-13									
20											

ITEMS TRANSF	RELINQUISHED BY	DATE	TIME	RECEIVED BY	REASON FOR TRANSFER
1-19	L Cirello	8/13	4:20 PM	David Johnson	

ROUTING

- GC  INORG LAB MGR
- GCMS  GCMS MGR  LAB MGR
- ORG PREP  OFFICE MGR
- ORG LAB MGR  DATA MGR

DISTRIBUTION:

- WHITE - Sample Custodian
- YELLOW - Records
- PINK - Project Manager
- GOLD - Field Copy

ENVIRODYNE ENGINEERS  
1908 Innerbelt Business Center Drive  
St. Louis, Missouri 63114-5700  
314-426-0880

CUSTODY TRANSFER RECORD/LABORATORY WORK REQUEST

PROJECT NUMBER: 3639

DATE WORK IN 8/13/92

REPORT TO \_\_\_\_\_

Page 2 of 2

REQUESTED BY: L Crivello

RECEIVED BY: \_\_\_\_\_

DATE REQUIRED: \_\_\_\_\_

SPECIAL INSTRUCTIONS: Bill VOA Directly

SAMPLE IDENTIFICATION

ITEM	LAB NO.	SITE CODE SAMPLE DESCRIPTION	DATE COLLECTED	PRESERV.	CONTAINER	BETX	PINK	WHITE	TELETYPE	ANALYSES REQUESTED	COMMENTS
1	S 41-5	1-5 ft deep	8/13/92	NONE	Glass	X	X	X	X	ANALYZE all samples for BETX PNA TLLP Metals	
2	S 4-5-9	5-9 ft deep	8/13/92	NONE		X	X	X			
3	S 49-13	9-13 ft deep	8/13/92	NONE		X	X	X			
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

ITEMS TRANSF RELINQUISHED BY DATE TIME RECEIVED BY REASON FOR TRANSFER

✓-3 L Crivello 8/13/92 4:20 pm Givell Johnson

ROUTING

- GC
- INORG LAB MGR
- GCMS  GCMS MGR
- LAB MGR
- ORG PREP
- OFFICE MGR
- ORG LAB MGR
- DATA MGR

DISTRIBUTION:

- WHITE - Sample Custodian
- YELLOW - Records
- PINK - Project Manager
- GOLD - Field Cntr

TRACE ANALYTICAL LAB, INC.  
 300-B McDermott Drive, Berkeley, Illinois 60163  
 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8270(SIM)

LAB SAMPLE I.D. NO: Lab Blank FILE REF. NO: >A2682

DATE RECEIVED: DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	50.0 U
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	50.0 U
4. 86-73-7	FLUORENE -----	33.0 U
5. 85-01-8	PHENANTHRENE -----	33.0 U
6. 120-12-7	ANTHRACENE -----	83.0 U
7. 206-44-0	FLUORANTHENE -----	50.0 U
8. 129-00-0	PYRENE -----	50.0 U
9. 56-55-3	BENZO[A]ANTHRACENE -----	8.50 U
10. 218-01-9	CHRYSENE -----	50.0 U
11. 205-99-2	BENZO[B]FLUORANTHENE -----	11.0 U
12. 207-08-9	BENZO[K]FLUORANTHENE -----	11.0 U
13. 50-32-8	BENZO[A]PYRENE -----	15.0 U
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	15.0 U
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	25.0 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

GRACE ANALYTICAL LAB, INC.  
 5300-B McDermott Drive, Berkeley, Illinois 60163  
 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: I1, 1-5                                FILE REF. NO: >A2683  
 DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	5060
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	12600
4. 86-73-7	FLUORENE -----	11900
5. 85-01-8	PHENANTHRENE -----	42600
6. 120-12-7	ANTHRACENE -----	17800
7. 206-44-0	FLUORANTHENE -----	20300
8. 129-00-0	PYRENE -----	32500
9. 56-55-3	BENZO[A]ANTHRACENE -----	20700
10. 218-01-9	CHRYSENE -----	19300
11. 205-99-2	BENZO[B]FLUORANTHENE -----	13800
12. 207-08-9	BENZO[K]FLUORANTHENE -----	10300
13. 50-32-8	BENZO[A]PYRENE -----	7910
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	9380
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	1540
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	8490

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

RACE ANALYTICAL LAB, INC.  
300-B McDermott Drive, Berkeley, Illinois 60163  
(708) 449-9449, FAX (708) 449-3663

## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639

US EPA METHOD: 8270(SIM)

LAB SAMPLE I.D. NO: I1, 5-9

FILE REF. NO: &gt;A2684

DATE RECEIVED: 08-13-92

DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	50.0 U
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	105
4. 86-73-7	FLUORENE -----	142
5. 85-01-8	PHENANTHRENE -----	1240
6. 120-12-7	ANTHRACENE -----	463
7. 206-44-0	FLUORANTHENE -----	1240
8. 129-00-0	PYRENE -----	1020
9. 56-55-3	BENZO[A]ANTHRACENE -----	424
10. 218-01-9	CHRYSENE -----	433
11. 205-99-2	BENZO[B]FLUORANTHENE -----	324
12. 207-08-9	BENZO[K]FLUORANTHENE -----	224
13. 50-32-8	BENZO[A]PYRENE -----	160
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	149
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	27.4
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	137

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
THE VALUE REPORTED IS THE METHOD DETECTION  
LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

GRACE ANALYTICAL LAB, INC.  
 5300-B McDermott Drive, Berkeley, Illinois 60163  
 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: I1, 9-13                            FILE REF. NO: >A2685  
 DATE RECEIVED: 08-13-92                                DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	449
2. 208-96-8	ACENAPHTHYLENE -----	209
3. 83-32-9	ACENAPHTHENE -----	885
4. 86-73-7	FLUORENE -----	1190
5. 85-01-8	PHENANTHRENE -----	5980
6. 120-12-7	ANTHRACENE -----	1600
7. 206-44-0	FLUORANTHENE -----	3520
8. 129-00-0	PYRENE -----	2790
9. 56-55-3	BENZO[A]ANTHRACENE -----	1050
10. 218-01-9	CHRYSENE -----	992
11. 205-99-2	BENZO[B]FLUORANTHENE -----	564
12. 207-08-9	BENZO[K]FLUORANTHENE -----	629
13. 50-32-8	BENZO[A]PYRENE -----	306
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	272
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	49.6
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	226

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

RACE ANALYTICAL LAB, INC.  
300-B McDermott Drive, Berkeley, Illinois 60163  
(708) 449-9449, FAX (708) 449-3663

## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                   US EPA METHOD: 8270(SIM)  
LAB SAMPLE I.D. NO: I2, 1-5                           FILE REF. NO: >A2686  
DATE RECEIVED: 08-13-92                           DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	778
2. 208-96-8	ACENAPHTHYLENE -----	89.0
3. 83-32-9	ACENAPHTHENE -----	955
4. 86-73-7	FLUORENE -----	1230
5. 85-01-8	PHENANTHRENE -----	8950
6. 120-12-7	ANTHRACENE -----	2760
7. 206-44-0	FLUORANTHENE -----	9780
8. 129-00-0	PYRENE -----	8290
9. 56-55-3	BENZO[A]ANTHRACENE -----	3150
10. 218-01-9	CHRYSENE -----	3150
11. 205-99-2	BENZO[B]FLUORANTHENE -----	2050
12. 207-08-9	BENZO[K]FLUORANTHENE -----	1830
13. 50-32-8	BENZO[A]PYRENE -----	1250
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	1250
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	200
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	1160

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
THE VALUE REPORTED IS THE METHOD DETECTION  
LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

GRACE ANALYTICAL LAB, INC.  
 5300-B McDermott Drive, Berkeley, Illinois 60163  
 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: I2, 5-9                                FILE REF. NO: >A2687  
 DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	279
2. 208-96-8	ACENAPHTHYLENE -----	90.9
3. 83-32-9	ACENAPHTHENE -----	298
4. 86-73-7	FLUORENE -----	471
5. 85-01-8	PHENANTHRENE -----	3050
6. 120-12-7	ANTHRACENE -----	1220
7. 206-44-0	FLUORANTHENE -----	2490
8. 129-00-0	PYRENE -----	2040
9. 56-55-3	BENZO[A]ANTHRACENE -----	797
10. 218-01-9	CHRYSENE -----	813
11. 205-99-2	BENZO[B]FLUORANTHENE -----	466
12. 207-08-9	BENZO[K]FLUORANTHENE -----	477
13. 50-32-8	BENZO[A]PYRENE -----	272
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	280
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	46.7
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	238

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

RACE ANALYTICAL LAB, INC.  
300-B McDermott Drive, Berkeley, Illinois 60163  
(708) 449-9449, FAX (708) 449-3663

## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8270(SIM)

LAB SAMPLE I.D. NO: I2, 9-13 FILE REF. NO: >A2688

DATE RECEIVED: 08-13-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	1570
2. 208-96-8	ACENAPHTHYLENE -----	385
3. 83-32-9	ACENAPHTHENE -----	2110
4. 86-73-7	FLUORENE -----	3170
5. 85-01-8	PHENANTHRENE -----	12700
6. 120-12-7	ANTHRACENE -----	4860
7. 206-44-0	FLUORANTHENE -----	10300
8. 129-00-0	PYRENE -----	8380
9. 56-55-3	BENZO[A]ANTHRACENE -----	3220
10. 218-01-9	CHRYSENE -----	2870
11. 205-99-2	BENZO[B]FLUORANTHENE -----	1820
12. 207-08-9	BENZO[K]FLUORANTHENE -----	1520
13. 50-32-8	BENZO[A]PYRENE -----	1010
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	1120
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	181
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	974

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
THE VALUE REPORTED IS THE METHOD DETECTION  
LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

GRACE ANALYTICAL LAB, INC.  
 5300-B McDermott Drive, Berkeley, Illinois 60163  
 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8270(SIM)

LAB SAMPLE I.D. NO: I3, 1-5 FILE REF. NO: >A2689

DATE RECEIVED: 08-13-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	751
2. 208-96-8	ACENAPHTHYLENE -----	69.5
3. 83-32-9	ACENAPHTHENE -----	2210
4. 86-73-7	FLUORENE -----	2080
5. 85-01-8	PHENANTHRENE -----	14000
6. 120-12-7	ANTHRACENE -----	8550
7. 206-44-0	FLUORANTHENE -----	14600
8. 129-00-0	PYRENE -----	13400
9. 56-55-3	BENZO[A]ANTHRACENE -----	4180
10. 218-01-9	CHRYSENE -----	4470
11. 205-99-2	BENZO[B]FLUORANTHENE -----	2580
12. 207-08-9	BENZO[K]FLUORANTHENE -----	3270
13. 50-32-8	BENZO[A]PYRENE -----	1920
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	2440
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	389
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	2240

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

GRACE ANALYTICAL LAB, INC.  
300-B McDermott Drive, Berkeley, Illinois 60163  
(708) 449-9449, FAX (708) 449-3663

## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8270(SIM)  
LAB SAMPLE I.D. NO: I3, 5-9 FILE REF. NO: >A2690  
DATE RECEIVED: 08-13-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
		(UG/KG)
1. 91-20-3	NAPHTHALENE -----	23900
2. 208-96-8	ACENAPHTHYLENE -----	1090
3. 83-32-9	ACENAPHTHENE -----	9600
4. 86-73-7	FLUORENE -----	6820
5. 85-01-8	PHENANTHRENE -----	49000
6. 120-12-7	ANTHRACENE -----	5230
7. 206-44-0	FLUORANTHENE -----	15200
8. 129-00-0	PYRENE -----	7760
9. 56-55-3	BENZO[A]ANTHRACENE -----	985
10. 218-01-9	CHRYSENE -----	1400
11. 205-99-2	BENZO[B]FLUORANTHENE -----	408
12. 207-08-9	BENZO[K]FLUORANTHENE -----	386
13. 50-32-8	BENZO[A]PYRENE -----	325
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	277
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	320

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
THE VALUE REPORTED IS THE METHOD DETECTION  
LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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 5300-B McDermott Drive, Berkeley, Illinois 60163  
 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: I3, 9-13                            FILE REF. NO: >A2691  
 DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
1. 91-20-3	NAPHTHALENE -----	106
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	278
4. 86-73-7	FLUORENE -----	111
5. 85-01-8	PHENANTHRENE -----	776
6. 120-12-7	ANTHRACENE -----	272
7. 206-44-0	FLUORANTHENE -----	1080
8. 129-00-0	PYRENE -----	983
9. 56-55-3	BENZO[A]ANTHRACENE -----	229
10. 218-01-9	CHRYSENE -----	248
11. 205-99-2	BENZO[B]FLUORANTHENE -----	157
12. 207-08-9	BENZO[K]FLUORANTHENE -----	106
13. 50-32-8	BENZO[A]PYRENE -----	98.8
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	154
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	173

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S1, 1-5                                FILE REF. NO: >A2692  
 DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	1150
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	4330
4. 86-73-7	FLUORENE -----	5490
5. 85-01-8	PHENANTHRENE -----	36000
6. 120-12-7	ANTHRACENE -----	23800
7. 206-44-0	FLUORANTHENE -----	40400
8. 129-00-0	PYRENE -----	35700
9. 56-55-3	BENZO[A]ANTHRACENE -----	9740
0. 218-01-9	CHRYSENE -----	10100
1. 205-99-2	BENZO[B]FLUORANTHENE -----	5780
12. 207-08-9	BENZO[K]FLUORANTHENE -----	3630
3. 50-32-8	BENZO[A]PYRENE -----	3330
4. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	3890
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	603
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	3780

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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 5300-B McDermott Drive, Berkeley, Illinois 60163  
 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639	US EPA METHOD: 8270(SIM)
LAB SAMPLE I.D. NO: S1, 5-9	FILE REF. NO: >A2693
DATE RECEIVED: 08-13-92	DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
1. 91-20-3 -----	NAPHTHALENE -----	50.0 U
2. 208-96-8 -----	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9 -----	ACENAPHTHENE -----	50.0 U
4. 86-73-7 -----	FLUORENE -----	38.2
5. 85-01-8 -----	PHENANTHRENE -----	256
6. 120-12-7 -----	ANTHRACENE -----	83.0 U
7. 206-44-0 -----	FLUORANTHENE -----	163
8. 129-00-0 -----	PYRENE -----	160
9. 56-55-3 -----	BENZO[A]ANTHRACENE -----	44.9
10. 218-01-9 -----	CHRYSENE -----	59.6
11. 205-99-2 -----	BENZO[B]FLUORANTHENE -----	31.8
12. 207-08-9 -----	BENZO[K]FLUORANTHENE -----	21.1
13. 50-32-8 -----	BENZO[A]PYRENE -----	20.2
14. 193-39-5 -----	INDENO[1,2,3-CD]PYRENE -----	26.0
15. 53-70-3 -----	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2 -----	BENZO[G,H,I]PERYLENE -----	33.6

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

RACE ANALYTICAL LAB, INC.  
5300-B McDermott Drive, Berkeley, Illinois 60163  
(708) 449-9449, FAX (708) 449-3663

## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639

US EPA METHOD: 8270(SIM)

LAB SAMPLE I.D. NO: S1, 9-13

FILE REF. NO: &gt;A2694

DATE RECEIVED: 08-13-92

DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	50.0 U
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	50.0 U
4. 86-73-7	FLUORENE -----	33.0 U
5. 85-01-8	PHENANTHRENE -----	175
6. 120-12-7	ANTHRACENE -----	83.0 U
7. 206-44-0	FLUORANTHENE -----	52.9
8. 129-00-0	PYRENE -----	59.3
9. 56-55-3	BENZO[A]ANTHRACENE -----	12.6
0. 218-01-9	CHRYSENE -----	50.0 U
1. 205-99-2	BENZO[B]FLUORANTHENE -----	11.0 U
12. 207-08-9	BENZO[K]FLUORANTHENE -----	11.0 U
3. 50-32-8	BENZO[A]PYRENE -----	15.0 U
4. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	15.0 U
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	25.0 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
THE VALUE REPORTED IS THE METHOD DETECTION  
LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

GRACE ANALYTICAL LAB, INC.  
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 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S2, 1-5                            FILE REF. NO: >A2695  
 DATE RECEIVED: 08-13-92                            DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	1340
2. 208-96-8	ACENAPHTHYLENE -----	57.7
3. 83-32-9	ACENAPHTHENE -----	1280
4. 86-73-7	FLUORENE -----	1570
5. 85-01-8	PHENANTHRENE -----	14800
6. 120-12-7	ANTHRACENE -----	4910
7. 206-44-0	FLUORANTHENE -----	14800
8. 129-00-0	PYRENE -----	13600
9. 56-55-3	BENZO[A]ANTHRACENE -----	4380
10. 218-01-9	CHRYSENE -----	4720
11. 205-99-2	BENZO[B]FLUORANTHENE -----	3000
12. 207-08-9	BENZO[K]FLUORANTHENE -----	2070
13. 50-32-8	BENZO[A]PYRENE -----	1880
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	2380
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	364
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	2380

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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300-B McDermott Drive, Berkeley, Illinois 60163  
(708) 449-9449, FAX (708) 449-3663

## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639

US EPA METHOD: 8270(SIM)

LAB SAMPLE I.D. NO: S2, 5-9

FILE REF. NO: &gt;A2696

DATE RECEIVED: 08-13-92

DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
		(UG/KG)
1. 91-20-3	NAPHTHALENE -----	46400
2. 208-96-8	ACENAPHTHYLENE -----	5340
3. 83-32-9	ACENAPHTHENE -----	29400
4. 86-73-7	FLUORENE -----	44400
5. 85-01-8	PHENANTHRENE -----	103000
6. 120-12-7	ANTHRACENE -----	75500
7. 206-44-0	FLUORANTHENE -----	31100
8. 129-00-0	PYRENE -----	32700
9. 56-55-3	BENZO[A]ANTHRACENE -----	25200
10. 218-01-9	CHRYSENE -----	29100
11. 205-99-2	BENZO[B]FLUORANTHENE -----	11800
12. 207-08-9	BENZO[K]FLUORANTHENE -----	15500
13. 50-32-8	BENZO[A]PYRENE -----	8940
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	10900
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	1750
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	10400

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
THE VALUE REPORTED IS THE METHOD DETECTION  
LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S2, 9-13                            FILE REF. NO: >A2697  
 DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	2480
2. 208-96-8	ACENAPHTHYLENE -----	263
3. 83-32-9	ACENAPHTHENE -----	2120
4. 86-73-7	FLUORENE -----	3260
5. 85-01-8	PHENANTHRENE -----	10600
6. 120-12-7	ANTHRACENE -----	6150
7. 206-44-0	FLUORANTHENE -----	7090
8. 129-00-0	PYRENE -----	6380
9. 56-55-3	BENZO[A]ANTHRACENE -----	1260
10. 218-01-9	CHRYSENE -----	1290
11. 205-99-2	BENZO[B]FLUORANTHENE -----	782
12. 207-08-9	BENZO[K]FLUORANTHENE -----	561
13. 50-32-8	BENZO[A]PYRENE -----	472
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	441
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	77.8
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	494

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639

US EPA METHOD: 8270(SIM)

LAB SAMPLE I.D. NO: S3, 1-5

FILE REF. NO: >A2698

DATE RECEIVED: 08-13-92

DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	1560
2. 208-96-8	ACENAPHTHYLENE -----	84.9
3. 83-32-9	ACENAPHTHENE -----	4290
4. 86-73-7	FLUORENE -----	5180
5. 85-01-8	PHENANTHRENE -----	24700
6. 120-12-7	ANTHRACENE -----	12700
7. 206-44-0	FLUORANTHENE -----	25600
8. 129-00-0	PYRENE -----	24600
9. 56-55-3	BENZO[A]ANTHRACENE -----	7120
10. 218-01-9	CHRYSENE -----	7080
11. 205-99-2	BENZO[B]FLUORANTHENE -----	3770
12. 207-08-9	BENZO[K]FLUORANTHENE -----	2670
13. 50-32-8	BENZO[A]PYRENE -----	2400
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	3380
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	517
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	3470

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S3, 5-9                                FILE REF. NO: >A2699  
 DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
1. 91-20-3	NAPHTHALENE -----	2170
2. 208-96-8	ACENAPHTHYLENE -----	100
3. 83-32-9	ACENAPHTHENE -----	3010
4. 86-73-7	FLUORENE -----	5850
5. 85-01-8	PHENANTHRENE -----	33300
6. 120-12-7	ANTHRACENE -----	9620
7. 206-44-0	FLUORANTHENE -----	33700
8. 129-00-0	PYRENE -----	28700
9. 56-55-3	BENZO[A]ANTHRACENE -----	10300
10. 218-01-9	CHRYSENE -----	10500
11. 205-99-2	BENZO[B]FLUORANTHENE -----	6090
12. 207-08-9	BENZO[K]FLUORANTHENE -----	5270
13. 50-32-8	BENZO[A]PYRENE -----	4010
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	5030
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	893
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	5040

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Enviodyne Engineers - 3639

US EPA METHOD: 8270(SIM)

LAB SAMPLE I.D. NO: S3, 9-13

FILE REF. NO: &gt;A2700

DATE RECEIVED: 08-13-92

DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
		(UG/KG)
1. 91-20-3	NAPHTHALENE -----	111
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	442
4. 86-73-7	FLUORENE -----	292
5. 85-01-8	PHENANTHRENE -----	1770
6. 120-12-7	ANTHRACENE -----	802
7. 206-44-0	FLUORANTHENE -----	2140
8. 129-00-0	PYRENE -----	1740
9. 56-55-3	BENZO[A]ANTHRACENE -----	387
10. 218-01-9	CHRYSENE -----	424
11. 205-99-2	BENZO[B]FLUORANTHENE -----	274
12. 207-08-9	BENZO[K]FLUORANTHENE -----	184
13. 50-32-8	BENZO[A]PYRENE -----	189
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	163
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	22.9
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	173

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
THE VALUE REPORTED IS THE METHOD DETECTION  
LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S4, 1-5                            FILE REF. NO: >A2701  
 DATE RECEIVED: 08-13-92                            DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	64.9
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	279
4. 86-73-7	FLUORENE -----	252
5. 85-01-8	PHENANTHRENE -----	1570
6. 120-12-7	ANTHRACENE -----	678
7. 206-44-0	FLUORANTHENE -----	2710
8. 129-00-0	PYRENE -----	2630
9. 56-55-3	BENZO[A]ANTHRACENE -----	642
10. 218-01-9	CHRYSENE -----	615
11. 205-99-2	BENZO[B]FLUORANTHENE -----	314
12. 207-08-9	BENZO[K]FLUORANTHENE -----	199
13. 50-32-8	BENZO[A]PYRENE -----	193
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	253
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	31.2
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	268

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

RACE ANALYTICAL LAB, INC.  
300-B McDermott Drive, Berkeley, Illinois 60163  
(708) 449-9449, FAX (708) 449-3663

## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8270(SIM)  
LAB SAMPLE I.D. NO: S4, 5-9 FILE REF. NO: >A2702  
DATE RECEIVED: 08-13-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	50.0 U
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	50.0 U
4. 86-73-7	FLUORENE -----	73.0
5. 85-01-8	PHENANTHRENE -----	463
6. 120-12-7	ANTHRACENE -----	185
7. 206-44-0	FLUORANTHENE -----	204
8. 129-00-0	PYRENE -----	206
9. 56-55-3	BENZO[A]ANTHRACENE -----	29.9
0. 218-01-9	CHRYSENE -----	38.5
1. 205-99-2	BENZO[B]FLUORANTHENE -----	11.0 U
12. 207-08-9	BENZO[K]FLUORANTHENE -----	11.0 U
13. 50-32-8	BENZO[A]PYRENE -----	15.0 U
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	15.0 U
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	25.0 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
THE VALUE REPORTED IS THE METHOD DETECTION  
LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                   US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S4, 9-13                           FILE REF. NO: >A2703  
 DATE RECEIVED: 08-13-92                           DATE ANALYZED: 08-21-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	(UG/KG)
1. 91-20-3 -----	NAPHTHALENE -----	50.0 U
2. 208-96-8 -----	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9 -----	ACENAPHTHENE -----	101
4. 86-73-7 -----	FLUORENE -----	43.8
5. 85-01-8 -----	PHENANTHRENE -----	304
6. 120-12-7 -----	ANTHRACENE -----	262
7. 206-44-0 -----	FLUORANTHENE -----	673
8. 129-00-0 -----	PYRENE -----	695
9. 56-55-3 -----	BENZO[A]ANTHRACENE -----	144
10. 218-01-9 -----	CHRYSENE -----	150
11. 205-99-2 -----	BENZO[B]FLUORANTHENE -----	62.2
12. 207-08-9 -----	BENZO[K]FLUORANTHENE -----	34.8
13. 50-32-8 -----	BENZO[A]PYRENE -----	34.3
14. 193-39-5 -----	INDENO[1,2,3-CD]PYRENE -----	37.5
15. 53-70-3 -----	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2 -----	BENZO[G,H,I]PERYLENE -----	41.7

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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SEMIVOLATILE ORGANICS  
QUALITY CONTROL DATA SHEET  
SURROGATE SPIKE PERCENT RECOVERY  
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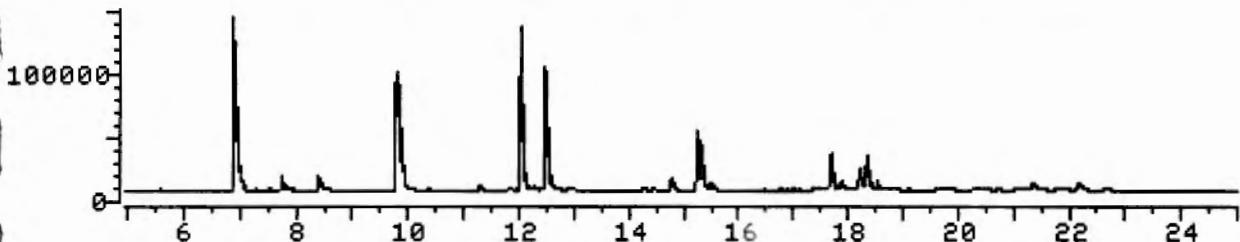
STUDY NAME: Envirodyne Engineers - 3639

DATE: 08-20-92

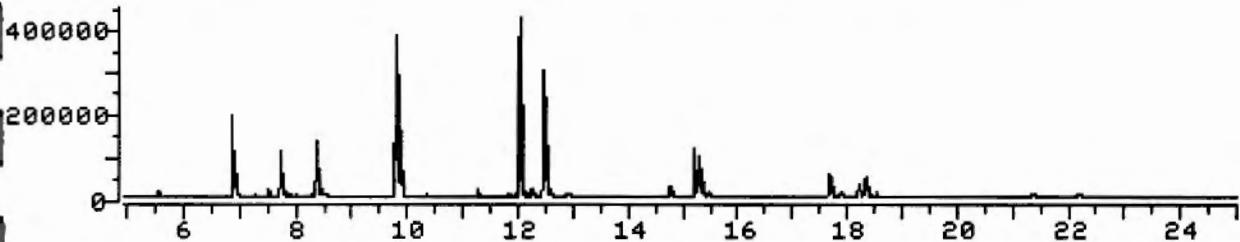
SAMPLE #	SPIKE LEVEL	RESULT	% RECOVERY
A2684	100	44.6	45
A2685	100	50.5	51

\* Surrogate Spike Compound: 2-Fluorobiphenyl

File >A2684 9999.0-0.0 amu. EEI: 3639-I1, 5-9 08-20-92 PNASIM  
TIC



File >A2685 9999.0-0.0 amu. EEI: 3639-I1, 9-13 08-20-92 PNASIM  
TIC



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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: Lab Blank                            FILE REF. NO: >V6712  
DATE RECEIVED:    DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: I1, 1-5 FILE REF. NO: >V6713  
DATE RECEIVED: 08-13-92 DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: I1, 5-9                                FILE REF. NO: >V6714  
DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: II, 9-13 FILE REF. NO: >V6715  
DATE RECEIVED: 08-13-92 DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                   US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: I2, 1-5                           FILE REF. NO: >V6716  
DATE RECEIVED: 08-13-92                           DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: I2, 5-9 FILE REF. NO: >V6717  
DATE RECEIVED: 08-13-92 DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: I2, 9-13                            FILE REF. NO: >V6718  
DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Enviodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: I3, 1-5                            FILE REF. NO: >V6719  
DATE RECEIVED: 08-13-92                            DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	2.16
2. 108-88-3 -----	TOLUENE -----	2.07
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: I3, 5-9                                FILE REF. NO: >V6720  
DATE RECEIVED: 08-13-92                                      DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	5.34
2. 108-88-3 -----	TOLUENE -----	10.5
3. 100-41-4 -----	ETHYLBENZENE -----	3.12
4. 1330-20-7 -----	XYLENE (total) -----	12.3

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: I3, 9-13                            FILE REF. NO: >V6721  
DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S1, 1-5                                FILE REF. NO: >V6722  
DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S1, 5-9                                FILE REF. NO: >V6723  
DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S1, 9-13                            FILE REF. NO: >V6724  
DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S2, 1-5                                FILE REF. NO: >V6725  
DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	7.78
2. 108-88-3 -----	TOLUENE -----	2.66
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S2, 5-9                                FILE REF. NO: >V6726  
DATE RECEIVED: 08-13-92                                      DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	12.5
2. 108-88-3 -----	TOLUENE -----	11.9
3. 100-41-4 -----	ETHYLBENZENE -----	8.81
4. 1330-20-7 -----	XYLENE (total) -----	31.2

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S2, 9-13                            FILE REF. NO: >V6727  
DATE RECEIVED: 08-13-92                            DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S3, 1-5                                FILE REF. NO: >V6728  
DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S3, 9-13                            FILE REF. NO: >V6730  
DATE RECEIVED: 08-13-92                            DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S4, 1-5                                FILE REF. NO: >V6731  
DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	3.34
2. 108-88-3 -----	TOLUENE -----	1.95
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LAB, INC.  
5300-B MCDERMOTT DRIVE, BERKELEY, ILLINOIS 60163  
(708) 449-9449, FAX (708) 449-3663

1 OF 1

BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S3, 5-9                                FILE REF. NO: >V6729  
DATE RECEIVED: 08-13-92                                      DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LAB, INC.  
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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S4, 5-9                                FILE REF. NO: >V6732  
DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LAB, INC.  
6300-B McDERMOTT DRIVE, BERKELEY, ILLINOIS 60163  
(708) 449-9449, FAX (708) 449-3663

1 OF 1

BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S4, 5-9 Duplicate FILE REF. NO: >V6734  
DATE RECEIVED: 08-13-92 DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LAB, INC.  
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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S4, 9-13                            FILE REF. NO: >V6733  
DATE RECEIVED: 08-13-92                                    DATE ANALYZED: 08-17-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

RACE ANALYTICAL LAB, INC.  
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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: Lab Blank                            FILE REF. NO: >V6802  
DATE RECEIVED:    DATE ANALYZED: 08-27-92

CAS #	COMPOUND	AMOUNT (UG/L)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT FOR REAGENT WATER.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LABORATORY, INC.  
5300-B McDermott Drive, Berkeley, Illinois 60163  
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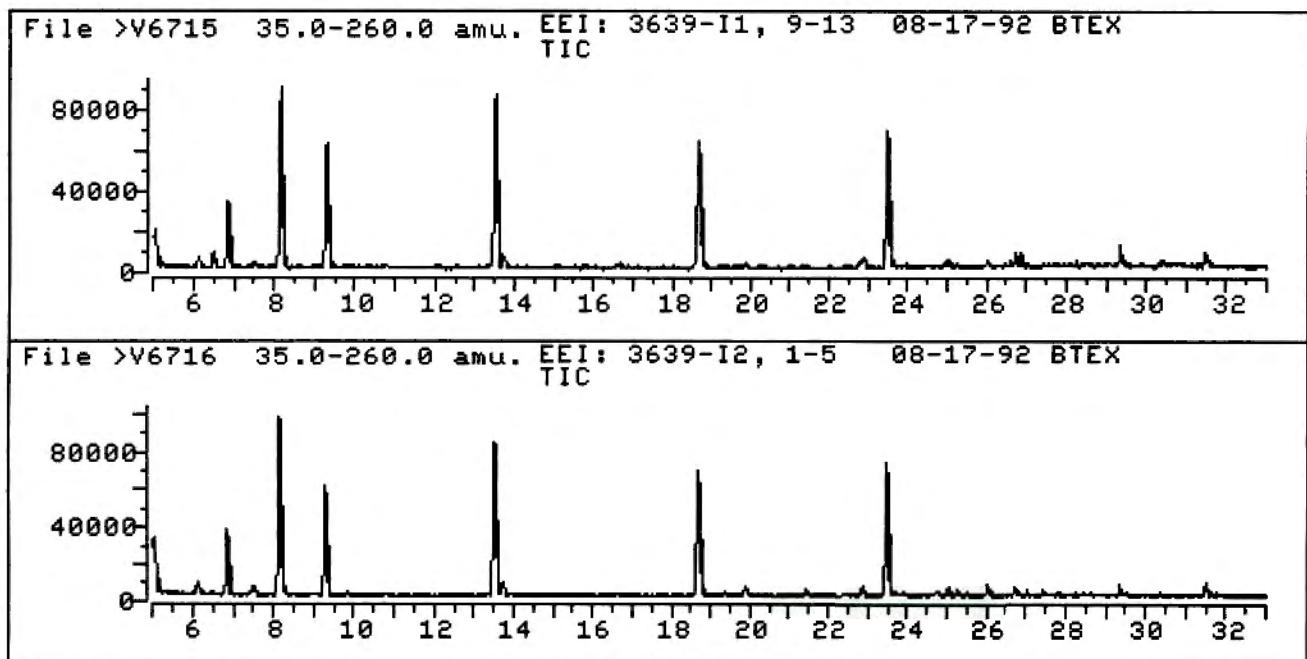
VOLATILE ORGANICS  
QUALITY CONTROL DATA SHEET  
SURROGATE SPIKE PERCENT RECOVERY  
=====

STUDY NAME: Envirodyne Engineers - 3639

DATE: 08-17-92

SAMPLE #	SPIKE LEVEL	RESULT	% RECOVERY
V6715	10.0	8.63	86
V6716	10.0	8.54	85

\*\* Surrogate Spike Compound: Bromofluorobenzene



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INORGANIC ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639

US EPA METHOD: 1311 / AA

CLP METALS

RESULTS (MG/L)

TEST:	As	Ba	Cd	Cr	Pb	Hg	Se	Ag
I1 1-5	<0.01	5.4	0.02	0.05	0.47	<0.0002	<0.7	0.02
I1 5-9	<0.01	1.1	<0.01	0.03	3.45	<0.0002	<0.7	<0.01
I1 9-13	<0.01	1.7	<0.01	0.03	0.66	<0.0002	<0.7	<0.01
I2 1-5	<0.01	1.4	<0.01	0.02	0.15	<0.0002	<0.7	0.02
I2 5-9	<0.01	2.4	0.02	0.02	0.17	<0.0002	<0.7	0.02
I2 9-13	<0.01	2.7	<0.01	0.02	0.13	<0.0002	<0.7	<0.01
I3 1-5	<0.01	5.2	0.03	<0.01	22.2	<0.0002	<0.7	0.02
I3 5-9	20.0	1.4	<0.01	<0.01	0.26	<0.0002	<0.7	<0.01
I3 9-13	<0.01	1.0	<0.01	<0.01	0.32	<0.0002	<0.7	<0.01
S1 1-5	<0.01	1.2	<0.01	0.02	0.20	<0.0002	<0.7	<0.01
S1 5-9	<0.01	3.1	<0.01	<0.01	0.13	<0.0002	<0.7	<0.01
S1 9-13	<0.01	4.4	<0.01	<0.01	0.14	<0.0002	<0.7	<0.01
S2 1-5	0.32	2.1	0.03	0.02	10.8	<0.0002	<0.7	<0.01
S2 5-9	<0.01	2.6	<0.01	0.02	0.09	<0.0002	<0.7	<0.01
S2 9-13	<0.01	2.0	0.03	0.02	57.6	<0.0002	<0.7	<0.01
S3 1-5	<0.01	18.5	0.02	0.02	4.18	<0.0002	<0.7	0.03
S3 5-9	<0.01	2.8	<0.01	0.03	0.46	<0.0002	<0.7	0.02
S3 9-13	<0.01	2.2	<0.01	<0.01	0.14	<0.0002	<0.7	0.02
S4 1-5	<0.01	1.4	<0.01	<0.01	0.13	<0.0002	<0.7	<0.01
S4 5-9	<0.01	2.0	<0.01	<0.01	0.05	<0.0002	<0.7	<0.01
S4 9-13	<0.01	1.3	<0.01	<0.01	0.14	<0.0002	<0.7	0.02

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QA/QC REPORT FOR INORGANICS ANALYSES

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STUDY NAME: Envirodyne Engineers - 3639

DATE ANALYZED: 08-26-92

TEST	BLANK	SAMPLE I2 1-5 (SR)	DUP. SAMPLE	REL. % DIF (RPD)	SPIKE ADDED (SA)	SPIKE REC. (SSR)	% REC.
TCLP METALS							
As	<0.01	<0.01	<0.01	0.0	0.2	0.2	100
Ba	<0.10	5.2	5.4	3.8	2.5	8.0	112
Cd	<0.01	0.03	0.03	0.0	0.20	0.24	105
Cr	<0.01	<0.01	<0.01	0.0	2.21	2.29	104
Pb	<0.01	22.2	22.0	4.5	0.56	22.85	116
Hg	<0.0002	<0.0002	<0.0002	0.0	0.0100	0.0102	102
Se	<0.7	<0.7	<0.7	0.0	1.70	1.70	100
Ag	<0.01	0.02	0.02	0.0	0.45	0.46	98

UNITS ARE IN PPM

RPD = (DIFFERENCE OF SAMPLE & DUPLICATE / MEAN) X 100

% REC = [(SSR-SR)/SA] x 100

WRC ENGINEERS  
1908 Innerbelt Business Center Drive  
St. Louis, Missouri 63114-5700  
(314) 426-0880

CUSTODY TRANSFER RECORD/LABORATORY WORK REQUEST

PROJECT NUMBER: 3639

DATE WORK IN

8/18/92

REPORT TO

Page 1 of 1

REQUESTED BY: L Crivello

RECEIVED BY

DATE REQUIRED

SPECIAL INSTRUCTIONS:

SAMPLE IDENTIFICATION

ITEM	LAB NO.	SITE CODE SAMPLE DESCRIPTION	DATE COLLECTED	PRESERV.	CONTAINER	BETX	DNA	METALS	PCP	ANALYSES REQUESTED	COMMENTS
1	S5 1-5	From Streetcar Drive 1-5 ft	8/17/92	None	4 oz Glass X X						Analyze all for BETX PNA
2	S5 5-9	From Streetcar Dr 5-9 ft deep	8/17/92								TCLP Metals
3	S5 9-13	9-13 ft deep	8/17/92								
4	S6 1-5	1-5 ft deep	8/17/92								
5	S6 5-9	5-9 ft depth	8/17/92								
6	S6 9-13	9-13 ft depth	8/17/92								
7	S7 1-5	1-5 ft depth	8/17/92								
8	S7 5-9	5-9 ft depth	8/17/92								
9	S7 9-13	9-13 ft depth	8/17/92								
10	S8 1-5	1-5 ft depth	8/17/92								
11	S8 5-9	5-9 ft depth	8/17/92								
12	S8 9-13	9-13 ft depth	8/17/92								
13	S9 1-5	1-5 ft depth	8/18/92								
14	S9 5-9	5-9 ft depth	8/18/92								
15	S9 9-13	9-13 ft depth	8/18/92								
16	S10 1-5	1-5 ft depth	8/18/92								
17	S10 5-9	5-9 ft depth	8/18/92								
18	S10 9-13	9-13 ft depth	8/18/92	↓	↓	↓	↓	↓	↓		
19											
20											

ITEMS TRANSF

RELINQUISHED BY

DATE

TIME

RECEIVED BY

REASON FOR TRANSFER

1-18

Lynn Powell 8/16/92 4:30P Delivered by Transportation

ROUTING

- GC       INORG LAB MGR  
 GCMS       GCMS MGR       LAB MGR  
 ORG PREP       OFFICE MGR  
 ORG LAB MGR       DATA MGR

DISTRIBUTION:

WHITE - Sample Custodian  
YELLOW - Records  
PINK - Project Manager  
GOLD - Field Copy

GRACE ANALYTICAL LAB, INC.  
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(708) 449-9449, FAX (708) 449-3663

1 OF 1

BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: Lab Blank                            FILE REF. NO: >V6762  
DATE RECEIVED:    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LAB, INC.  
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1 OF 1

BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S5, 1-5 FILE REF. NO: >V6763  
DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	2.31
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LAB, INC.  
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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S5, 5-9                                FILE REF. NO: >V6764  
DATE RECEIVED: 08-18-92                                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LAB, INC.  
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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S5, 9-13 FILE REF. NO: >V6765  
DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S6, 1-5                                FILE REF. NO: >V6766  
DATE RECEIVED: 08-18-92                                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	4.58

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S6, 5-9 FILE REF. NO: >V6767  
DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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5300-B MCDERMOTT DRIVE, BERKELEY, ILLINOIS 60163  
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BTEX ANALYSIS DATA SHEET  
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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S6, 9-13                            FILE REF. NO: >V6768  
DATE RECEIVED: 08-18-92                                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S7, 1-5 FILE REF. NO: >V6769  
DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	3.67
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S7, 5-9                                FILE REF. NO: >V6770  
DATE RECEIVED: 08-18-92                                      DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S7, 9-13 FILE REF. NO: >V6771  
DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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1 OF 1

BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S8, 1-5                                FILE REF. NO: >V6772  
DATE RECEIVED: 08-18-92                                      DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LAB, INC.  
5300-B MCDERMOTT DRIVE, BERKELEY, ILLINOIS 60163  
(708) 449-9449, FAX (708) 449-3663

1 OF 1

BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S8, 5-9                                FILE REF. NO: >V6773  
DATE RECEIVED: 08-18-92                                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LAB, INC.  
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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S8, 9-13                            FILE REF. NO: >V6774  
DATE RECEIVED: 08-18-92                                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S9, 1-5 FILE REF. NO: >V6775  
DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	26.0
2. 108-88-3 -----	TOLUENE -----	7.37
3. 100-41-4 -----	ETHYLBENZENE -----	2.93
4. 1330-20-7 -----	XYLENE (total) -----	4.65

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

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SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S9, 5-9                                FILE REF. NO: >V6776  
DATE RECEIVED: 08-18-92                                      DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S9, 9-13 FILE REF. NO: >V6777  
DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

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SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S10, 1-5                            FILE REF. NO: >V6778  
DATE RECEIVED: 08-18-92                                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

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SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S10, 5-9 FILE REF. NO: >V6779  
DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	7.59
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

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SFC - SUSPECTED FIELD CONTAMINANT

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(708) 449-9449, FAX (708) 449-3663

1 OF 1

BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S10, 9-13                    FILE REF. NO: >V6780  
DATE RECEIVED: 08-18-92                    DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.

J - BELOW DETECTION LIMIT

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SFC - SUSPECTED FIELD CONTAMINANT

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S10, 5-9 Duplicate FILE REF. NO: >V6781  
DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-21-92

CAS #	COMPOUND	AMOUNT (UG/KG)
1. 71-43-2 -----	BENZENE -----	8.31
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LABORATORY, INC.  
5300-B McDermott Drive, Berkeley, Illinois 60163  
(708) 449-9449, FAX (708) 449-3663

1 OF 1

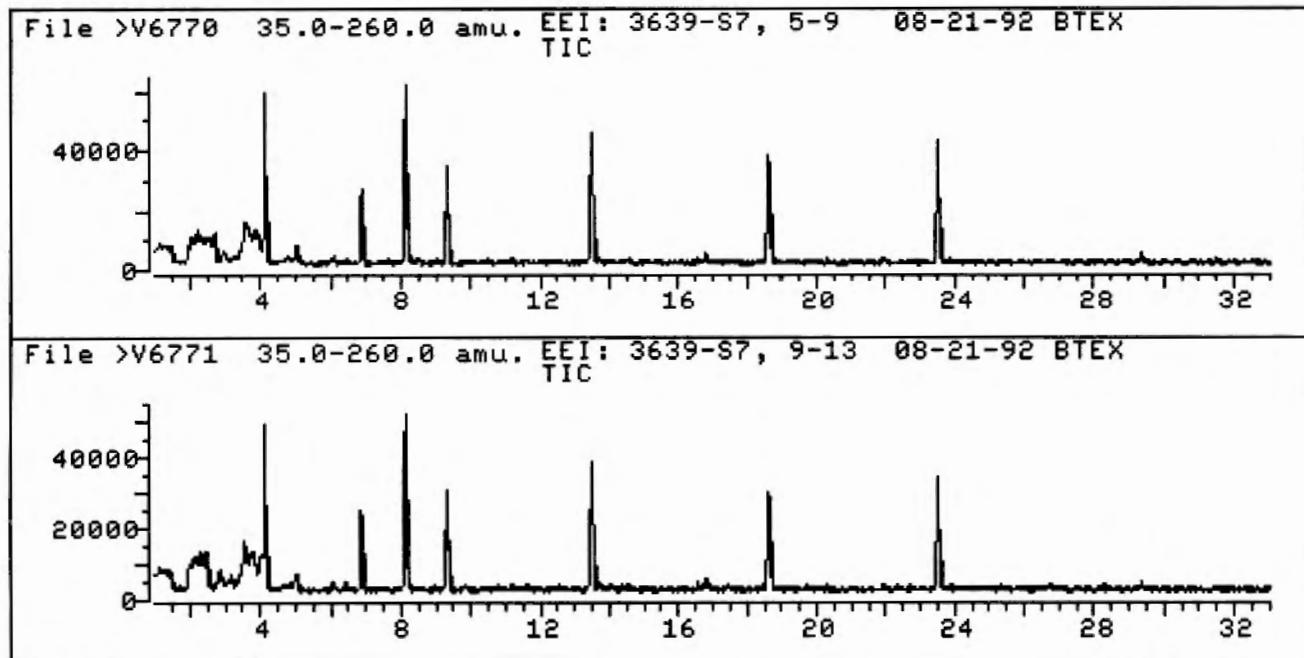
VOLATILE ORGANICS  
QUALITY CONTROL DATA SHEET  
SURROGATE SPIKE PERCENT RECOVERY  
=====

STUDY NAME: Envirodyne Engineers - 3639

DATE: 08-21-92

SAMPLE #	SPIKE LEVEL	RESULT	% RECOVERY
V6770	10.0	8.47	85
V6771	10.0	8.32	83

\*\* Surrogate Spike Compound: Bromofluorobenzene



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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                   US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: Lab Blank                           FILE REF. NO: >A2742  
 DATE RECEIVED:   DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	50.0 U
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	50.0 U
4. 86-73-7	FLUORENE -----	33.0 U
5. 85-01-8	PHENANTHRENE -----	33.0 U
6. 120-12-7	ANTHRACENE -----	83.0 U
7. 206-44-0	FLUORANTHENE -----	50.0 U
8. 129-00-0	PYRENE -----	50.0 U
9. 56-55-3	BENZO[A]ANTHRACENE -----	8.50 U
10. 218-01-9	CHRYSENE -----	50.0 U
11. 205-99-2	BENZO[B]FLUORANTHENE -----	11.0 U
12. 207-08-9	BENZO[K]FLUORANTHENE -----	11.0 U
13. 50-32-8	BENZO[A]PYRENE -----	15.0 U
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	15.0 U
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	25.0 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S5, 1-5                                FILE REF. NO: >A2743  
 DATE RECEIVED: 08-18-92                                    DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	2990
2. 208-96-8	ACENAPHTHYLENE -----	73.7
3. 83-32-9	ACENAPHTHENE -----	14300
4. 86-73-7	FLUORENE -----	18800
5. 85-01-8	PHENANTHRENE -----	17600
6. 120-12-7	ANTHRACENE -----	5870
7. 206-44-0	FLUORANTHENE -----	94900
8. 129-00-0	PYRENE -----	69400
9. 56-55-3	BENZO[A]ANTHRACENE -----	14900
10. 218-01-9	CHRYSENE -----	15200
11. 205-99-2	BENZO[B]FLUORANTHENE -----	12200
12. 207-08-9	BENZO[K]FLUORANTHENE -----	6870
13. 50-32-8	BENZO[A]PYRENE -----	6020
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	2620
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	605
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	5440

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
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SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S5, 5-9                            FILE REF. NO: >A2744  
 DATE RECEIVED: 08-18-92                            DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	50.0 U
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	139
4. 86-73-7	FLUORENE -----	86.3
5. 85-01-8	PHENANTHRENE -----	460
6. 120-12-7	ANTHRACENE -----	120
7. 206-44-0	FLUORANTHENE -----	183
8. 129-00-0	PYRENE -----	157
9. 56-55-3	BENZO[A]ANTHRACENE -----	30.7
10. 218-01-9	CHRYSENE -----	50.0 U
11. 205-99-2	BENZO[B]FLUORANTHENE -----	12.1
12. 207-08-9	BENZO[K]FLUORANTHENE -----	11.0 U
13. 50-32-8	BENZO[A]PYRENE -----	15.0 U
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	15.0 U
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	25.0 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

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SFC - SUSPECTED FIELD CONTAMINANT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S5, 9-13                            FILE REF. NO: >A2745  
 DATE RECEIVED: 08-18-92                                    DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
1. 91-20-3	NAPHTHALENE -----	50.0 U
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	50.0 U
4. 86-73-7	FLUORENE -----	33.0 U
5. 85-01-8	PHENANTHRENE -----	130
6. 120-12-7	ANTHRACENE -----	83.0 U
7. 206-44-0	FLUORANTHENE -----	50.0 U
8. 129-00-0	PYRENE -----	50.0 U
9. 56-55-3	BENZO[A]ANTHRACENE -----	8.50 U
10. 218-01-9	CHRYSENE -----	50.0 U
11. 205-99-2	BENZO[B]FLUORANTHENE -----	11.0 U
12. 207-08-9	BENZO[K]FLUORANTHENE -----	11.0 U
13. 50-32-8	BENZO[A]PYRENE -----	15.0 U
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	15.0 U
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	25.0 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

RACE ANALYTICAL LAB, INC.  
300-B McDermott Drive, Berkeley, Illinois 60163  
(708) 449-9449, FAX (708) 449-3663

## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8270(SIM)  
LAB SAMPLE I.D. NO: S6, 1-5 FILE REF. NO: >A2746  
DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	517
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	3520
4. 86-73-7	FLUORENE -----	2760
5. 85-01-8	PHENANTHRENE -----	24500
6. 120-12-7	ANTHRACENE -----	10400
7. 206-44-0	FLUORANTHENE -----	31900
8. 129-00-0	PYRENE -----	24600
9. 56-55-3	BENZO[A]ANTHRACENE -----	6150
10. 218-01-9	CHRYSENE -----	5950
11. 205-99-2	BENZO[B]FLUORANTHENE -----	3790
12. 207-08-9	BENZO[K]FLUORANTHENE -----	2130
13. 50-32-8	BENZO[A]PYRENE -----	1950
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	1660
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	539
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	3250

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S6, 5-9                            FILE REF. NO: >A2747  
 DATE RECEIVED: 08-18-92                            DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
1. 91-20-3	NAPHTHALENE -----	(UG/KG) 114
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	561
4. 86-73-7	FLUORENE -----	256
5. 85-01-8	PHENANTHRENE -----	1890
6. 120-12-7	ANTHRACENE -----	835
7. 206-44-0	FLUORANTHENE -----	2340
8. 129-00-0	PYRENE -----	2150
9. 56-55-3	BENZO[A]ANTHRACENE -----	709
10. 218-01-9	CHRYSENE -----	642
11. 205-99-2	BENZO[B]FLUORANTHENE -----	382
12. 207-08-9	BENZO[K]FLUORANTHENE -----	266
13. 50-32-8	BENZO[A]PYRENE -----	232
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	184
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	51.1
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	397

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

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J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                   US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S6, 9-13                           FILE REF. NO: >A2748  
 DATE RECEIVED: 08-18-92                           DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE	210
2. 208-96-8	ACENAPHTHYLENE	81.9
3. 83-32-9	ACENAPHTHENE	709
4. 86-73-7	FLUORENE	383
5. 85-01-8	PHENANTHRENE	2910
6. 120-12-7	ANTHRACENE	929
7. 206-44-0	FLUORANTHENE	1860
8. 129-00-0	PYRENE	1740
9. 56-55-3	BENZO[A]ANTHRACENE	608
10. 218-01-9	CHRYSENE	586
11. 205-99-2	BENZO[B]FLUORANTHENE	354
12. 207-08-9	BENZO[K]FLUORANTHENE	329
13. 50-32-8	BENZO[A]PYRENE	255
14. 193-39-5	INDENO[1,2,3-CD]PYRENE	207
15. 53-70-3	DIBENZO[A,H]ANTHRACENE	50.0
16. 191-24-2	BENZO[G,H,I]PERYLENE	240

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S7, 1-5                            FILE REF. NO: >A2749  
 DATE RECEIVED: 08-18-92                            DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
1. 91-20-3 -----	NAPHTHALENE -----	50.0 U
2. 208-96-8 -----	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9 -----	ACENAPHTHENE -----	50.0 U
4. 86-73-7 -----	FLUORENE -----	33.0 U
5. 85-01-8 -----	PHENANTHRENE -----	128
6. 120-12-7 -----	ANTHRACENE -----	83.0 U
7. 206-44-0 -----	FLUORANTHENE -----	272
8. 129-00-0 -----	PYRENE -----	95.2
9. 56-55-3 -----	BENZO[A]ANTHRACENE -----	64.8
10. 218-01-9 -----	CHRYSENE -----	77.6
11. 205-99-2 -----	BENZO[B]FLUORANTHENE -----	11.0 U
12. 207-08-9 -----	BENZO[K]FLUORANTHENE -----	11.0 U
13. 50-32-8 -----	BENZO[A]PYRENE -----	15.0 U
14. 193-39-5 -----	INDENO[1,2,3-CD]PYRENE -----	15.0 U
15. 53-70-3 -----	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2 -----	BENZO[G,H,I]PERYLENE -----	25.0 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

GRACE ANALYTICAL LAB, INC.  
 5300-B McDermott Drive, Berkeley, Illinois 60163  
 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639

US EPA METHOD: 8270(SIM)

LAB SAMPLE I.D. NO: S7, 5-9

FILE REF. NO: >A2750

DATE RECEIVED: 08-18-92

DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	50.0 U
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	50.0 U
4. 86-73-7	FLUORENE -----	33.0 U
5. 85-01-8	PHENANTHRENE -----	91.1
6. 120-12-7	ANTHRACENE -----	83.0 U
7. 206-44-0	FLUORANTHENE -----	50.0 U
8. 129-00-0	PYRENE -----	50.0 U
9. 56-55-3	BENZO[A]ANTHRACENE -----	8.50 U
10. 218-01-9	CHRYSENE -----	50.0 U
11. 205-99-2	BENZO[B]FLUORANTHENE -----	11.0 U
12. 207-08-9	BENZO[K]FLUORANTHENE -----	11.0 U
13. 50-32-8	BENZO[A]PYRENE -----	15.0 U
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	15.0 U
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	25.0 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639	US EPA METHOD: 8270(SIM)
LAB SAMPLE I.D. NO: S7, 5-9 Duplicate	FILE REF. NO: >A2761
DATE RECEIVED: 08-18-92	DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
1. 91-20-3 -----	NAPHTHALENE -----	50.0 U
2. 208-96-8 -----	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9 -----	ACENAPHTHENE -----	50.0 U
4. 86-73-7 -----	FLUORENE -----	33.0 U
5. 85-01-8 -----	PHENANTHRENE -----	109
6. 120-12-7 -----	ANTHRACENE -----	83.0 U
7. 206-44-0 -----	FLUORANTHENE -----	50.0 U
8. 129-00-0 -----	PYRENE -----	50.0 U
9. 56-55-3 -----	BENZO[A]ANTHRACENE -----	8.50 U
10. 218-01-9 -----	CHRYSENE -----	50.0 U
11. 205-99-2 -----	BENZO[B]FLUORANTHENE -----	11.0 U
12. 207-08-9 -----	BENZO[K]FLUORANTHENE -----	11.0 U
13. 50-32-8 -----	BENZO[A]PYRENE -----	15.0 U
14. 193-39-5 -----	INDENO[1,2,3-CD]PYRENE -----	15.0 U
15. 53-70-3 -----	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2 -----	BENZO[G,H,I]PERYLENE -----	25.0 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S7, 9-13                            FILE REF. NO: >A2751  
 DATE RECEIVED: 08-18-92                            DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	(UG/KG)
1. 91-20-3 -----	NAPHTHALENE -----	50.0 U
2. 208-96-8 -----	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9 -----	ACENAPHTHENE -----	50.0 U
4. 86-73-7 -----	FLUORENE -----	33.0 U
5. 85-01-8 -----	PHENANTHRENE -----	111
6. 120-12-7 -----	ANTHRACENE -----	83.0 U
7. 206-44-0 -----	FLUORANTHENE -----	50.0 U
8. 129-00-0 -----	PYRENE -----	50.0 U
9. 56-55-3 -----	BENZO[A]ANTHRACENE -----	8.50 U
10. 218-01-9 -----	CHRYSENE -----	50.0 U
11. 205-99-2 -----	BENZO[B]FLUORANTHENE -----	11.0 U
12. 207-08-9 -----	BENZO[K]FLUORANTHENE -----	11.0 U
13. 50-32-8 -----	BENZO[A]PYRENE -----	15.0 U
14. 193-39-5 -----	INDENO[1,2,3-CD]PYRENE -----	15.0 U
15. 53-70-3 -----	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2 -----	BENZO[G,H,I]PERYLENE -----	25.0 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S8, 1-5                            FILE REF. NO: >A2752  
 DATE RECEIVED: 08-18-92                            DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	5810
2. 208-96-8	ACENAPHTHYLENE -----	392
3. 83-32-9	ACENAPHTHENE -----	5630
4. 86-73-7	FLUORENE -----	7370
5. 85-01-8	PHENANTHRENE -----	8270
6. 120-12-7	ANTHRACENE -----	2760
7. 206-44-0	FLUORANTHENE -----	35000
8. 129-00-0	PYRENE -----	27500
9. 56-55-3	BENZO[A]ANTHRACENE -----	5760
10. 218-01-9	CHRYSENE -----	5830
11. 205-99-2	BENZO[B]FLUORANTHENE -----	5140
12. 207-08-9	BENZO[K]FLUORANTHENE -----	2090
13. 50-32-8	BENZO[A]PYRENE -----	2420
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	1010
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	313
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	2220

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                   US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S8, 5-9                           FILE REF. NO: >A2753  
 DATE RECEIVED: 08-18-92                           DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	618
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	753
4. 86-73-7	FLUORENE -----	864
5. 85-01-8	PHENANTHRENE -----	5820
6. 120-12-7	ANTHRACENE -----	1330
7. 206-44-0	FLUORANTHENE -----	4030
8. 129-00-0	PYRENE -----	1980
9. 56-55-3	BENZO[A]ANTHRACENE -----	289
10. 218-01-9	CHRYSENE -----	337
11. 205-99-2	BENZO[B]FLUORANTHENE -----	247
12. 207-08-9	BENZO[K]FLUORANTHENE -----	188
13. 50-32-8	BENZO[A]PYRENE -----	148
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	54.1
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	21.7
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	131

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S8, 9-13                    FILE REF. NO: >A2754  
 DATE RECEIVED: 08-18-92                    DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	50.0 U
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	75.6
4. 86-73-7	FLUORENE -----	44.8
5. 85-01-8	PHENANTHRENE -----	283
6. 120-12-7	ANTHRACENE -----	83.0 U
7. 206-44-0	FLUORANTHENE -----	87.2
8. 129-00-0	PYRENE -----	100
9. 56-55-3	BENZO[A]ANTHRACENE -----	8.50 U
10. 218-01-9	CHRYSENE -----	50.0 U
11. 205-99-2	BENZO[B]FLUORANTHENE -----	11.0 U
12. 207-08-9	BENZO[K]FLUORANTHENE -----	11.0 U
13. 50-32-8	BENZO[A]PYRENE -----	15.0 U
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	15.0 U
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	25.0 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8270(SIM)  
LAB SAMPLE I.D. NO: S9, 1-5 FILE REF. NO: >A2755  
DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	439
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	726
4. 86-73-7	FLUORENE -----	815
5. 85-01-8	PHENANTHRENE -----	5530
6. 120-12-7	ANTHRACENE -----	1470
7. 206-44-0	FLUORANTHENE -----	4570
8. 129-00-0	PYRENE -----	2560
9. 56-55-3	BENZO[A]ANTHRACENE -----	382
10. 218-01-9	CHRYSENE -----	418
11. 205-99-2	BENZO[B]FLUORANTHENE -----	347
12. 207-08-9	BENZO[K]FLUORANTHENE -----	234
13. 50-32-8	BENZO[A]PYRENE -----	188
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	105
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	28.3
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	193

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
THE VALUE REPORTED IS THE METHOD DETECTION  
LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639	US EPA METHOD: 8270(SIM)
LAB SAMPLE I.D. NO: S9, 5-9	FILE REF. NO: >A2756
DATE RECEIVED: 08-18-92	DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
		(UG/KG)
1. 91-20-3 -----	NAPHTHALENE -----	50.0 U
2. 208-96-8 -----	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9 -----	ACENAPHTHENE -----	125
4. 86-73-7 -----	FLUORENE -----	122
5. 85-01-8 -----	PHENANTHRENE -----	807
6. 120-12-7 -----	ANTHRACENE -----	207
7. 206-44-0 -----	FLUORANTHENE -----	649
8. 129-00-0 -----	PYRENE -----	344
9. 56-55-3 -----	BENZO[A]ANTHRACENE -----	61.3
10. 218-01-9 -----	CHRYSENE -----	68.2
11. 205-99-2 -----	BENZO[B]FLUORANTHENE -----	54.5
12. 207-08-9 -----	BENZO[K]FLUORANTHENE -----	36.7
13. 50-32-8 -----	BENZO[A]PYRENE -----	35.6
14. 193-39-5 -----	INDENO[1,2,3-CD]PYRENE -----	17.4
15. 53-70-3 -----	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2 -----	BENZO[G,H,I]PERYLENE -----	32.0

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

RACE ANALYTICAL LAB, INC.  
300-B McDermott Drive, Berkeley, Illinois 60163  
(708) 449-9449, FAX (708) 449-3663

## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Enviodyne Engineers - 3639 US EPA METHOD: 8270(SIM)  
LAB SAMPLE I.D. NO: S9, 9-13 FILE REF. NO: >A2757  
DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	50.0 U
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	238
4. 86-73-7	FLUORENE -----	165
5. 85-01-8	PHENANTHRENE -----	781
6. 120-12-7	ANTHRACENE -----	255
7. 206-44-0	FLUORANTHENE -----	373
8. 129-00-0	PYRENE -----	318
9. 56-55-3	BENZO[A]ANTHRACENE -----	51.0
10. 218-01-9	CHRYSENE -----	58.0
11. 205-99-2	BENZO[B]FLUORANTHENE -----	18.8
12. 207-08-9	BENZO[K]FLUORANTHENE -----	13.3
13. 50-32-8	BENZO[A]PYRENE -----	15.0 U
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	15.0 U
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	25.0 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
THE VALUE REPORTED IS THE METHOD DETECTION  
LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639	US EPA METHOD: 8270(SIM)
LAB SAMPLE I.D. NO: S10, 1-5	FILE REF. NO: >A2758
DATE RECEIVED: 08-18-92	DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
1. 91-20-3 -----	NAPHTHALENE -----	1280
2. 208-96-8 -----	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9 -----	ACENAPHTHENE -----	1600
4. 86-73-7 -----	FLUORENE -----	1610
5. 85-01-8 -----	PHENANTHRENE -----	8620
6. 120-12-7 -----	ANTHRACENE -----	3300
7. 206-44-0 -----	FLUORANTHENE -----	9330
8. 129-00-0 -----	PYRENE -----	6880
9. 56-55-3 -----	BENZO[A]ANTHRACENE -----	1660
10. 218-01-9 -----	CHRYSENE -----	1500
11. 205-99-2 -----	BENZO[B]FLUORANTHENE -----	864
12. 207-08-9 -----	BENZO[K]FLUORANTHENE -----	447
13. 50-32-8 -----	BENZO[A]PYRENE -----	473
14. 193-39-5 -----	INDENO[1,2,3-CD]PYRENE -----	273
15. 53-70-3 -----	DIBENZO[A,H]ANTHRACENE -----	56.5
16. 191-24-2 -----	BENZO[G,H,I]PERYLENE -----	521

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S10, 5-9 FILE REF. NO: >A2759  
 DATE RECEIVED: 08-18-92 DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION (UG/KG)
1. 91-20-3	NAPHTHALENE -----	3400
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	2180
4. 86-73-7	FLUORENE -----	2360
5. 85-01-8	PHENANTHRENE -----	10800
6. 120-12-7	ANTHRACENE -----	4210
7. 206-44-0	FLUORANTHENE -----	9680
8. 129-00-0	PYRENE -----	7040
9. 56-55-3	BENZO[A]ANTHRACENE -----	974
10. 218-01-9	CHRYSENE -----	956
11. 205-99-2	BENZO[B]FLUORANTHENE -----	863
12. 207-08-9	BENZO[K]FLUORANTHENE -----	436
13. 50-32-8	BENZO[A]PYRENE -----	432
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	218
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	53.9
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	434

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                   US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S10, 9-13                           FILE REF. NO: >A2760  
 DATE RECEIVED: 08-18-92                               DATE ANALYZED: 08-27-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
1. 91-20-3	NAPHTHALENE -----	2180
2. 208-96-8	ACENAPHTHYLENE -----	50.0 U
3. 83-32-9	ACENAPHTHENE -----	1430
4. 86-73-7	FLUORENE -----	1470
5. 85-01-8	PHENANTHRENE -----	8180
6. 120-12-7	ANTHRACENE -----	2230
7. 206-44-0	FLUORANTHENE -----	4260
8. 129-00-0	PYRENE -----	2330
9. 56-55-3	BENZO[A]ANTHRACENE -----	369
10. 218-01-9	CHRYSENE -----	371
11. 205-99-2	BENZO[B]FLUORANTHENE -----	280
12. 207-08-9	BENZO[K]FLUORANTHENE -----	176
13. 50-32-8	BENZO[A]PYRENE -----	152
14. 193-39-5	INDENO[1,2,3-CD]PYRENE -----	93.6
15. 53-70-3	DIBENZO[A,H]ANTHRACENE -----	20.0 U
16. 191-24-2	BENZO[G,H,I]PERYLENE -----	164

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT FOR CONTROLLED SEDIMENTS

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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1 OF 1

SEMIVOLATILE ORGANICS  
QUALITY CONTROL DATA SHEET  
SURROGATE SPIKE PERCENT RECOVERY  
=====

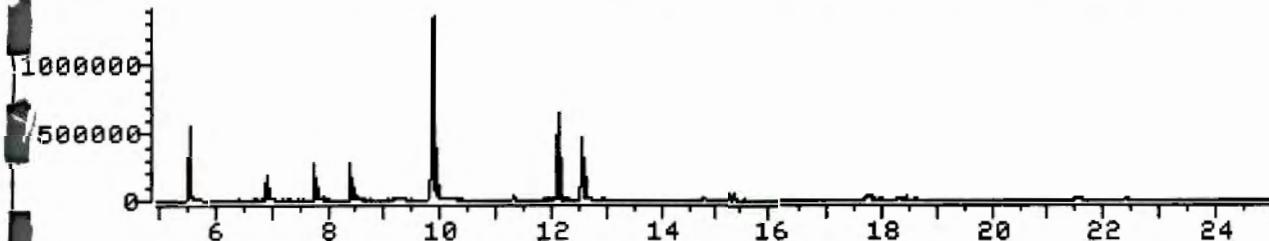
STUDY NAME: Envirodyne Engineers - 3639

DATE: 08-27-92

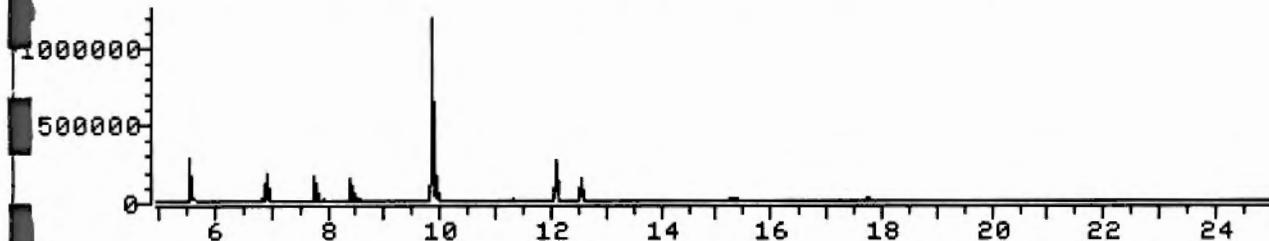
SAMPLE #	SPIKE LEVEL	RESULT	% RECOVERY
A2759	100	47.5	48
A2760	100	53.0	53

\* Surrogate Spike Compound: 2-Fluorobiphenyl

File >A2759 9999.0-0.0 amu. EEI: 3639-S10, 5-9 08-27-92 PNASIM  
TIC



File >A2760 9999.0-0.0 amu. EEI: 3639-S10, 9-13 08-27-92 PNASIM  
TIC



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INORGANIC ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639

US EPA METHOD: 1311 / AA

TCLP METALS

RESULTS (MG/L)

TEST:	As	Ba	Cd	Cr	Pb	Hg	Se	Ag
S5 1-5	<0.01	2.4	<0.01	0.02	0.22	<0.001	<0.7	<0.01
S5 5-9	<0.01	2.3	0.02	0.02	0.15	<0.001	<0.7	0.02
S5 9-13	<0.01	4.3	<0.01	0.03	0.14	<0.001	<0.7	<0.01
S6 1-5	<0.01	2.5	<0.01	0.02	1.36	<0.001	<0.7	<0.01
S6 5-9	<0.01	2.7	<0.01	<0.01	0.27	<0.001	<0.7	0.02
S6 9-13	<0.01	2.0	<0.01	0.02	0.19	<0.001	1.0	0.02
S7 1-5	<0.01	2.3	<0.01	<0.01	2.63	<0.001	1.0	<0.01
S7 5-9	<0.01	4.6	<0.01	<0.01	0.06	<0.001	0.8	<0.01
S7 9-13	<0.01	2.5	<0.01	0.03	0.15	<0.001	1.0	0.02
S8 1-5	<0.01	8.4	0.02	0.02	0.54	<0.001	<0.7	0.03
S8 5-9	<0.01	1.6	0.02	0.02	0.15	<0.001	<0.7	<0.01
S8 9-13	<0.01	2.2	<0.01	<0.01	0.17	<0.001	<0.7	0.02
S9 1-5	<0.01	2.8	0.02	0.02	0.92	<0.001	<0.7	<0.01
S9 5-9	<0.01	2.6	0.02	0.02	0.11	<0.001	0.8	0.02
S9 9-13	<0.01	3.4	<0.01	<0.01	0.11	<0.001	<0.7	0.02
S10 1-5	<0.01	2.0	0.02	<0.01	2.34	<0.001	<0.7	0.02
S10 5-9	<0.01	1.7	0.02	0.02	1.13	<0.001	<0.7	<0.01
S10 9-13	<0.01	2.3	<0.01	0.03	0.32	<0.001	<0.7	0.02

GRACE ANALYTICAL LABORATORY, INC.  
5300-B McDERMOTT DRIVE, BERKELEY, ILLINOIS 60163  
(708) 449-9449, FAX (708) 449-3663

QA/QC REPORT FOR INORGANICS ANALYSES

---

STUDY NAME: Envirodyne Engineers - 3639

DATE ANALYZED: 08-31-92

TEST	BLANK	SAMPLE (SR)	DUP. SAMPLE	REL. % DIF (RPD)	SPIKE ADDED (SA)	SPIKE REC. (SSR)	% REC.
TCLP METALS							
As	<0.01	<0.01	<0.01	0.0	0.2	0.2	100
Ba	<0.10	0.74	0.74	0.0	9.40	9.63	95
Cd	<0.01	<0.01	<0.01	0.0	1.36	1.27	93
Cr	<0.01	<0.01	<0.01	0.0	0.40	0.38	95
Pb	<0.01	0.13	0.13	0.0	0.52	0.56	83
Hg	<0.0001	<0.0001	<0.0001	0.0	0.0115	0.0117	102
Se	<0.7	<0.7	<0.7	0.0	3.0	2.82	94
Ag	<0.01	<0.01	<0.01	0.0	0.48	0.43	90

UNITS ARE IN PPM

RPD = (DIFFERENCE OF SAMPLE & DUPLICATE / MEAN) X 100

% REC = [(SSR-SR)/SA] X 100

**APPENDIX C**  
**GROUNDWATER ANALYSIS**

GRACE ANALYTICAL LAB, INC.  
300-B MCDERMOTT DRIVE, BERKELEY, ILLINOIS 60163  
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1 OF 1

BTEX ANALYSIS DATA SHEET

---

STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S1, Ground Water FILE REF. NO: >V6803  
DATE RECEIVED: 08-21-92 DATE ANALYZED: 08-27-92

CAS #	COMPOUND	AMOUNT (UG/L)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE REPORTED IS THE METHOD DETECTION LIMIT FOR REAGENT WATER.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LAB, INC.  
5300-B MCDERMOTT DRIVE, BERKELEY, ILLINOIS 60163  
(708) 449-9449, FAX (708) 449-3663

1 OF 1

BTEX ANALYSIS DATA SHEET

---

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S9, Ground Water                    FILE REF. NO: >V6806  
DATE RECEIVED: 08-21-92                                    DATE ANALYZED: 08-27-92

CAS #	COMPOUND	AMOUNT (UG/L)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT FOR REAGENT WATER.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

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300-B MCDERMOTT DRIVE, BERKELEY, ILLINOIS 60163  
(708) 449-9449, FAX (708) 449-3663

1 OF 1

BTEX ANALYSIS DATA SHEET

=====

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S6, Ground Water                    FILE REF. NO: >V6805  
DATE RECEIVED: 08-21-92                                    DATE ANALYZED: 08-27-92

CAS #	COMPOUND	AMOUNT (UG/L)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT FOR REAGENT WATER.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LAB, INC.  
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(708) 449-9449, FAX (708) 449-3663

1 OF 1

BTEX ANALYSIS DATA SHEET

=====

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S3, Ground Water                    FILE REF. NO: >V6804  
DATE RECEIVED: 08-21-92                                    DATE ANALYZED: 08-27-92

CAS #	COMPOUND	AMOUNT (UG/L)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT FOR REAGENT WATER.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

GRACE ANALYTICAL LAB, INC.

1 OF 1

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BTEX ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8240  
LAB SAMPLE I.D. NO: S10, Ground Water FILE REF. NO: >V6807  
DATE RECEIVED: 08-21-92 DATE ANALYZED: 08-27-92

CAS #	COMPOUND	AMOUNT (UG/L)
1. 71-43-2 -----	BENZENE -----	1.5 U
2. 108-88-3 -----	TOLUENE -----	1.5 U
3. 100-41-4 -----	ETHYLBENZENE -----	1.5 U
4. 1330-20-7 -----	XYLENE (total) -----	2.5 U

CODES: U - COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE VALUE  
REPORTED IS THE METHOD DETECTION LIMIT FOR REAGENT WATER.  
J - BELOW DETECTION LIMIT  
SLC - SUSPECTED LABORATORY CONTAMINANT  
SFC - SUSPECTED FIELD CONTAMINANT

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5300-B McDermott Drive, Berkeley, Illinois 60163  
(708) 449-9449, FAX (708) 449-3663

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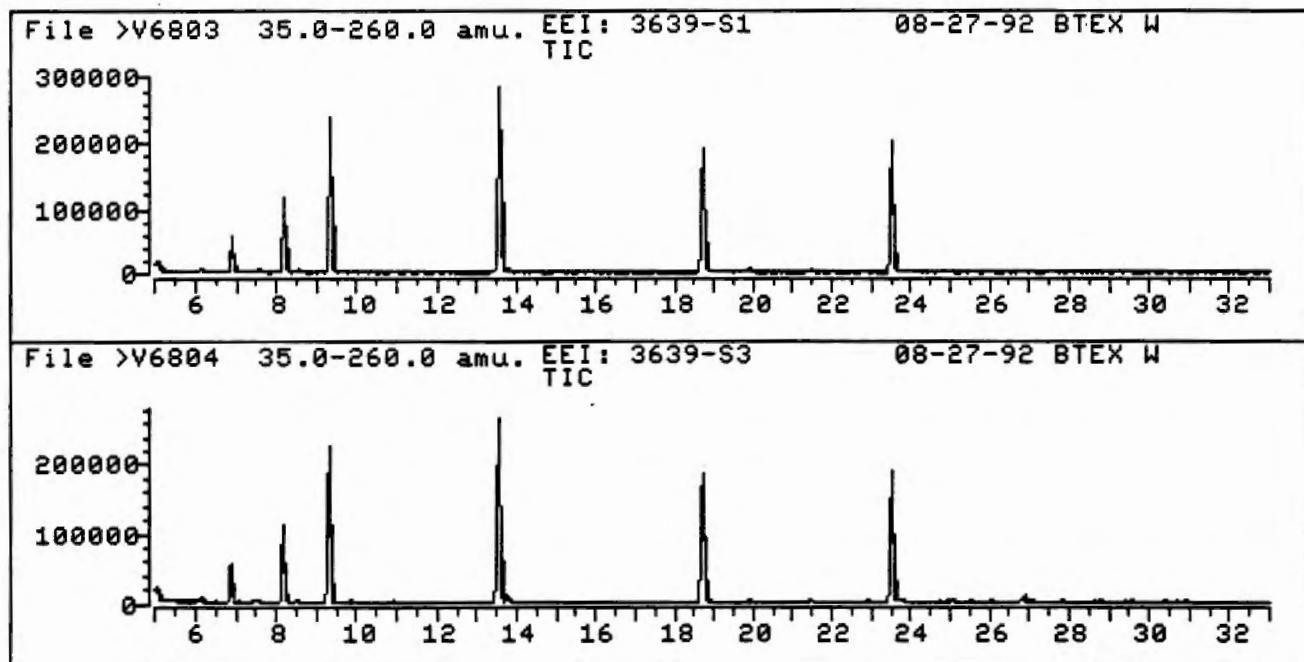
VOLATILE ORGANICS  
QUALITY CONTROL DATA SHEET  
SURROGATE SPIKE PERCENT RECOVERY

---

STUDY NAME: Envirodyne Engineers - 3639, Ground water DATE: 08-27-92

SAMPLE #	SPIKE LEVEL	RESULT	% RECOVERY
V6803	10.0	9.73	97
V6804	10.0	9.47	95

\*\* Surrogate Spike Compound: Bromofluorobenzene



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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639

US EPA METHOD: 8270(SIM)

LAB SAMPLE I.D. NO: Lab Blank

FILE REF. NO: >A2772

DATE RECEIVED:

DATE ANALYZED: 09-01-92

CAS #	COMPOUND	CONCENTRATION (UG/L)
1. 91-20-3	NAPHTHALENE -----	2.0 U
2. 208-96-8	ACENAPHTHYLENE -----	1.5 U
3. 83-32-9	ACENAPHTHENE -----	1.5 U
4. 86-73-7	FLUORENE -----	1.0 U
5. 85-01-8	PHENANTHRENE -----	1.0 U
6. 120-12-7	ANTHRACENE -----	2.5 U
7. 206-44-0	FLUORANTHENE -----	1.5 U
8. 129-00-0	PYRENE -----	1.5 U
9. 56-55-3	BENZO(A)ANTHRACENE -----	0.1 U
0. 218-01-9	CHRYSENE -----	1.5 U
11. 205-99-2	BENZO(B)FLUORANTHENE -----	0.1 U
12. 207-08-9	BENZO(K)FLUORANTHENE -----	0.1 U
13. 50-32-8	BENZO(A)PYRENE -----	0.2 U
4. 193-39-5	INDENO(1,2,3-CD)PYRENE -----	0.4 U
15. 53-70-3	DIBENZO(A,H)ANTHRACENE -----	0.3 U
16. 191-24-2	BENZO(GHI)PERYLENE -----	0.7 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT.

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

GRACE ANALYTICAL LAB, INC.  
 5300-B McDermott Drive, Berkeley, Illinois 60163  
 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

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STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S1, Ground Water                    FILE REF. NO: >A2773  
 DATE RECEIVED: 08-21-92                                    DATE ANALYZED: 09-01-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
1. 91-20-3	NAPHTHALENE -----	2.0 U
2. 208-96-8	ACENAPHTHYLENE -----	1.5 U
3. 83-32-9	ACENAPHTHENE -----	1.5 U
4. 86-73-7	FLUORENE -----	1.0 U
5. 85-01-8	PHENANTHRENE -----	1.0 U
6. 120-12-7	ANTHRACENE -----	2.5 U
7. 206-44-0	FLUORANTHENE -----	1.5 U
8. 129-00-0	PYRENE -----	1.5 U
9. 56-55-3	BENZO(A)ANTHRACENE -----	0.1 U
10. 218-01-9	CHRYSENE -----	1.5 U
11. 205-99-2	BENZO(B)FLUORANTHENE -----	0.1 U
12. 207-08-9	BENZO(K)FLUORANTHENE -----	0.1 U
13. 50-32-8	BENZO(A)PYRENE -----	0.2 U
14. 193-39-5	INDENO(1,2,3-CD)PYRENE -----	0.4 U
15. 53-70-3	DIBENZO(A,H)ANTHRACENE -----	0.3 U
16. 191-24-2	BENZO(GHI)PERYLENE -----	0.7 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT.

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639 US EPA METHOD: 8270(SIM)  
LAB SAMPLE I.D. NO: S3, Ground Water FILE REF. NO: >A2774  
DATE RECEIVED: 08-21-92 DATE ANALYZED: 09-01-92

CAS #	COMPOUND	CONCENTRATION (UG/L)
1. 91-20-3	NAPHTHALENE -----	2.0 U
2. 208-96-8	ACENAPHTHYLENE -----	1.5 U
3. 83-32-9	ACENAPHTHENE -----	1.5 U
4. 86-73-7	FLUORENE -----	1.0 U
5. 85-01-8	PHENANTHRENE -----	1.0 U
6. 120-12-7	ANTHRACENE -----	2.5 U
7. 206-44-0	FLUORANTHENE -----	1.5 U
8. 129-00-0	PYRENE -----	1.5 U
9. 56-55-3	BENZO(A)ANTHRACENE -----	0.1 U
10. 218-01-9	CHRYSENE -----	1.5 U
11. 205-99-2	BENZO(B)FLUORANTHENE -----	0.1 U
12. 207-08-9	BENZO(K)FLUORANTHENE -----	0.1 U
13. 50-32-8	BENZO(A)PYRENE -----	0.2 U
14. 193-39-5	INDENO(1,2,3-CD)PYRENE -----	0.4 U
15. 53-70-3	DIBENZO(A,H)ANTHRACENE -----	0.3 U
16. 191-24-2	BENZO(GHI)PERYLENE -----	0.7 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
THE VALUE REPORTED IS THE METHOD DETECTION  
LIMIT.

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

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STUDY NAME: Enviodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S6, Ground Water                    FILE REF. NO: >A2775  
 DATE RECEIVED: 08-21-92                                    DATE ANALYZED: 09-01-92

CAS #	COMPOUND	CONCENTRATION (UG/L)
1. 91-20-3	NAPHTHALENE -----	2.0 U
2. 208-96-8	ACENAPHTHYLENE -----	1.5 U
3. 83-32-9	ACENAPHTHENE -----	1.5 U
4. 86-73-7	FLUORENE -----	1.0 U
5. 85-01-8	PHENANTHRENE -----	1.0 U
6. 120-12-7	ANTHRACENE -----	2.5 U
7. 206-44-0	FLUORANTHENE -----	1.5 U
8. 129-00-0	PYRENE -----	1.5 U
9. 56-55-3	BENZO(A)ANTHRACENE -----	0.1 U
10. 218-01-9	CHRYSENE -----	1.5 U
11. 205-99-2	BENZO(B)FLUORANTHENE -----	0.1 U
12. 207-08-9	BENZO(K)FLUORANTHENE -----	0.1 U
13. 50-32-8	BENZO(A)PYRENE -----	0.2 U
14. 193-39-5	INDENO(1,2,3-CD)PYRENE -----	0.4 U
15. 53-70-3	DIBENZO(A,H)ANTHRACENE -----	0.3 U
16. 191-24-2	BENZO(GHI)PERYLENE -----	0.7 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT.

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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## POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                   US EPA METHOD: 8270(SIM)  
LAB SAMPLE I.D. NO: S9, Ground Water                   FILE REF. NO: >A2776  
DATE RECEIVED: 08-21-92                                   DATE ANALYZED: 09-01-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
		(UG/L)
1. 91-20-3	NAPHTHALENE -----	2.0 U
2. 208-96-8	ACENAPHTHYLENE -----	1.5 U
3. 83-32-9	ACENAPHTHENE -----	1.5 U
4. 86-73-7	FLUORENE -----	1.0 U
5. 85-01-8	PHENANTHRENE -----	1.0 U
6. 120-12-7	ANTHRACENE -----	2.5 U
7. 206-44-0	FLUORANTHENE -----	1.5 U
8. 129-00-0	PYRENE -----	1.5 U
9. 56-55-3	BENZO(A)ANTHRACENE -----	0.1 U
10. 218-01-9	CHRYSENE -----	1.5 U
11. 205-99-2	BENZO(B)FLUORANTHENE -----	0.1 U
12. 207-08-9	BENZO(K)FLUORANTHENE -----	0.1 U
13. 50-32-8	BENZO(A)PYRENE -----	0.2 U
14. 193-39-5	INDENO(1,2,3-CD)PYRENE -----	0.4 U
15. 53-70-3	DIBENZO(A,H)ANTHRACENE -----	0.3 U
16. 191-24-2	BENZO(GHI)PERYLENE -----	0.7 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
THE VALUE REPORTED IS THE METHOD DETECTION  
LIMIT.

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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 (708) 449-9449, FAX (708) 449-3663

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS DATA SHEET

STUDY NAME: Envirodyne Engineers - 3639                    US EPA METHOD: 8270(SIM)  
 LAB SAMPLE I.D. NO: S10, Ground Water                    FILE REF. NO: >A2777  
 DATE RECEIVED: 08-21-92                                    DATE ANALYZED: 09-01-92

CAS #	COMPOUND	CONCENTRATION
=====	=====	=====
1. 91-20-3	NAPHTHALENE -----	(UG/L) 2.0 U
2. 208-96-8	ACENAPHTHYLENE -----	1.5 U
3. 83-32-9	ACENAPHTHENE -----	2.12
4. 86-73-7	FLUORENE -----	1.58
5. 85-01-8	PHENANTHRENE -----	5.31
6. 120-12-7	ANTHRACENE -----	2.5 U
7. 206-44-0	FLUORANTHENE -----	2.19
8. 129-00-0	PYRENE -----	1.89
9. 56-55-3	BENZO(A)ANTHRACENE -----	0.1 U
10. 218-01-9	CHRYSENE -----	1.5 U
11. 205-99-2	BENZO(B)FLUORANTHENE -----	0.1 U
12. 207-08-9	BENZO(K)FLUORANTHENE -----	0.1 U
13. 50-32-8	BENZO(A)PYRENE -----	0.2 U
14. 193-39-5	INDENO(1,2,3-CD)PYRENE -----	0.4 U
15. 53-70-3	DIBENZO(A,H)ANTHRACENE -----	0.3 U
16. 191-24-2	BENZO(GHI)PERYLENE -----	0.7 U

CODES: U --- COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.  
 THE VALUE REPORTED IS THE METHOD DETECTION  
 LIMIT.

SLC - SUSPECTED LABORATORY CONTAMINANT

SFC - SUSPECTED FIELD CONTAMINANT

J --- BELOW DETECTION LIMIT

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(708) 449-9449, FAX (708) 449-3663

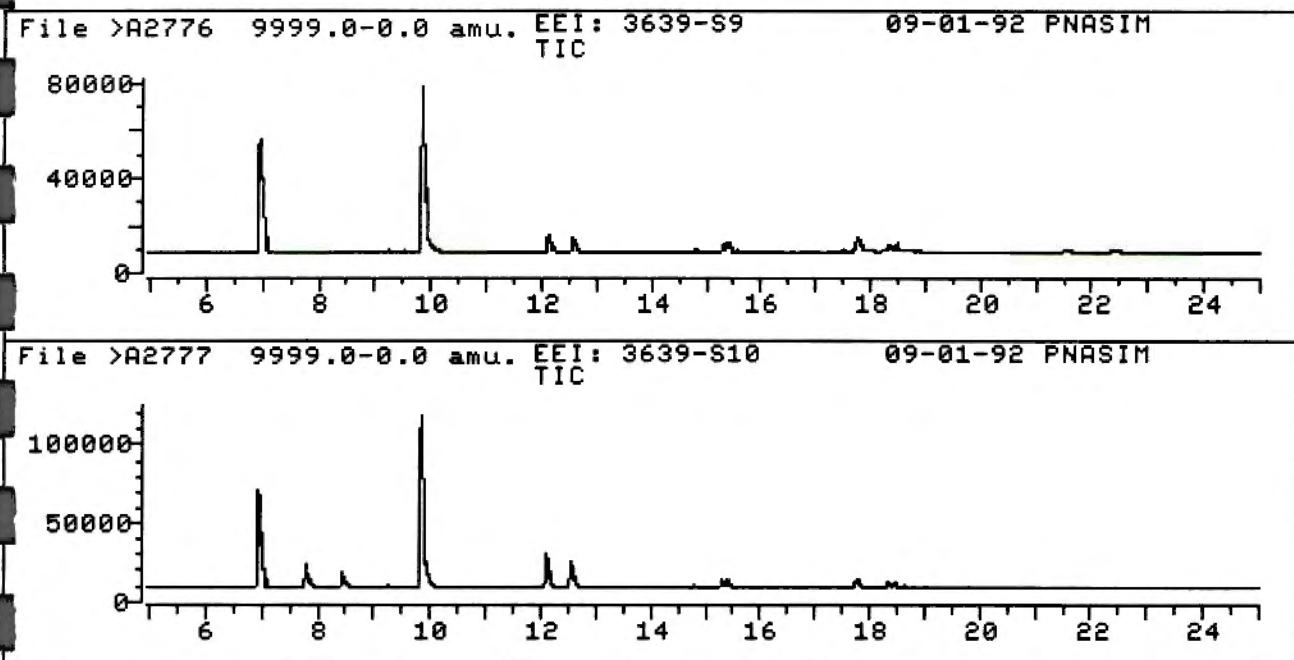
1 OF 1

SEMIVOLATILE ORGANICS  
QUALITY CONTROL DATA SHEET  
SURROGATE SPIKE PERCENT RECOVERY  
=====

STUDY NAME: Envirodyne Engineers - 3639 DATE: 09-01-92

SAMPLE #	SPIKE LEVEL	RESULT	% RECOVERY
A2776	100	61.5	62
A2777	100	54.5	55

\*\* Surrogate Spike Compound: 2-Fluorobiphenyl



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(708) 449-9449, FAX (708) 449-3663

INORGANIC ANALYSIS DATA SHEET

---

STUDY NAME: Envirodyne Engineers - 3639

DATE RECEIVED: 08-21-92

DATE ANALYZED: 09-02-92

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TEST	S1	S3	S6	S9	S10
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TOTAL METALS (PPM)

As	<0.01	<0.01	<0.01	<0.01	<0.01
Ba	0.2	0.4	0.2	1.2	0.2
Cd	<0.01	<0.01	<0.01	<0.01	<0.01
Cr	0.04	0.05	<0.01	0.05	<0.01
Pb	<0.01	<0.01	<0.01	<0.01	<0.01
Hg	<0.002	<0.002	<0.002	<0.002	<0.002
Se	<0.3	<0.3	<0.3	<0.3	<0.3
Ag	<0.01	<0.01	<0.01	<0.01	<0.01

GRACE ANALYTICAL LABORATORY, INC.  
300-B McDERMOTT DRIVE, BERKELEY, ILLINOIS 60163  
(708) 449-9449, FAX (708) 449-3663

QA/QC REPORT FOR INORGANICS ANALYSES

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STUDY NAME: Envirodyne Engineers - 3639

DATE ANALYZED: 09-02-92

TEST	BLANK	SAMPLE (SR)	DUP. SAMPLE	REL. % DIF (RPD)	SPIKE ADDED (SA)	SPIKE REC. (SSR)	% REC.
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CLP METALS

As	<0.01	<0.01	<0.01	0.0	0.2	0.2	100
Ba	<0.10	0.2	0.2	0.0	2.0	2.2	100
Cd	<0.01	<0.01	<0.01	0.0	0.19	0.19	100
Cr	<0.01	<0.01	<0.01	0.0	0.50	0.49	98
Pb	<0.01	<0.01	<0.01	0.0	0.17	0.18	94
Hg	<0.002	<0.002	<0.002	0.0	0.0107	0.0109	102
Se	<0.3	<0.3	<0.3	0.0	0.80	0.85	106
Ag	<0.01	<0.01	<0.01	0.0	0.36	0.39	108

UNITS ARE IN PPM

RPD = (DIFFERENCE OF SAMPLE & DUPLICATE / MEAN) X 100

REC = [(SSR-SR)/SA] X 100

**APPENDIX D**

**PRELIMINARY COST ESTIMATES FOR ENVIRONMENTAL REMEDIATION  
ON THE HEADLANDS**



**ENVIRODYNE  
ENGINEERS, INC.**

November 5, 1992

Navy Pier Reconstruction  
Headlands Street Improvements  
EEI Project No. 3639

**Preliminary Cost Estimates for  
Environmental Remediation on the Headlands**

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**Option 1**

Disposal of contaminated materials disturbed by construction

**In IDOT Areas**

Special Waste:	12,000 CY @ \$40 =	\$480,000
Hazardous Waste:	200 CY @ \$300 =	60,000
Analytical and Permitting (one time charge for Headlands)	1 LS @ \$7,000 =	<u>7,000</u>
		\$547,000

**In Park Areas**

Special Waste in Grassed Area:	7,000 CY @ \$40 =	280,000
Special Waste in Tree Area:	1,800 CY @ \$40 =	72,000
Hazardous Waste:	400 CY @ \$300 =	<u>120,000</u>
		\$472,000

**In Government Property Areas**

Special Waste:	3,000 CY @ \$40 =	120,000
Hazardous Waste:	200 CY @ \$300 =	<u>60,000</u>
		\$180,000

Total Headlands \$1,199,000

**Assumptions:**

1. Top 12" of existing pavement or soil is not contaminated and is disposed of as construction debris.
2. Excavation limit is 12 inches below subgrade in paved areas.
3. Unit costs include excavation, transportation and disposal.



ENVIRODYNE  
ENGINEERS, INC.

Option 2

Groundwater monitoring (Sample 4 wells 4 times per year)

Drill additional wells	2 each @ \$3,000 =	6,000
Sampling and laboratory analysis (per year)	4 each @ \$4,000 =	<u>16,000</u>
	initial year	\$22,000
	subsequent	\$16,000

Option 3

Bioremediation (add bacteria to soil)

Design and Installation	1 LS @ \$188,000 =	188,000
Operation and Maintenance (per year for 2 to 5 years)	=	<u>62,000</u>
	initial year	\$250,000
	subsequent	\$62,000

Option 4

Excavation and Disposal of Hazardous Waste to a depth of 13 feet      30,000 CY @ \$300 =      \$900,000

Option 5

Placement of geomembrane and 24" soil cap on non-paved areas.

Note: This option not workable with extensive tree planting because membrane would be damaged by tree roots.

